SONY

VIDEOCASSETTE RECORDER

UVW-1700GP
UVW-1400AP

SERVICE MANUAL

Vol.1 1st Edition

BETACAM SP

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Introducing this manual

This manual is the Service Manual Vol. 1 of the video cassette recorder model UVW-1700G/1700GP and UVW-1400A/1400AP.
This manual contains the maintenance information and servicing information necessary for parts replacement and adjustment.

Contains

The sections covered in the manual are summarized below to give you a general understanding of the manual.

Section 1	OPERATING INSTRUCTION
Section 2	INSTALLATION
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Section 4	MAINTENANCE MENU
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Related manuals

In addition to this Service Manual Vol. 1, the following manuals are provided.

- **Operation Manual (Supplied with equipment)**
Explains how to operate this equipment.

- **Service Manual Vol. 2 (Not supplied with equipment)**
Contains the block diagrams, board layouts, schematic diagrams, parts lists.

- **Protocol Manual (Supplied with equipment)**
Contains the 25-pin protocol information with based on RS-232C specification.

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PARTS

インデックスの使い方

1. 切り込みにそってはがし、
2. 中央の点線のところで山折りし、
3. のりや水をつけずに、
4. 中扉にそのまま張り、見出しにします。なお、その上からビニールテープでおおうといっそう長持ちします。
5. 万一張り違いのさいは白紙分をお使いください。

How to Use These Index Seals

1. Tear off them along each slit.
2. Fold them with a dotted line in the center.
3. Use no paste and water.
4. Attach them directly to each section divider as indexes. These seals last longer when they are covered with a clear vinyl tape.
5. If you have attached them incorrectly, use a blank sheet of paper.

SECTION 1
OPERATING INSTRUCTION

This section is extracted from operation manual.

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Precautions

To take best advantage of the many features of this unit, note the following important points.

Usable cassette tapes (see page 3-3(E))
Use only metal cassette tapes with this unit. Do not use oxide tapes.

Reference video input (see page 3-5(E))
When recording or playing back videotapes on this unit, always input a composite video signal synchronized with the video signal to be used to the REF. VIDEO INPUT connector. Especially when recording, failure to input a reference video signal to the REF. VIDEO INPUT connector will prevent the built-in time base stabilizer (TBS) from functioning correctly, causing picture breakup. Even if you are recording only audio signal or time code, do not fail to input a reference video signal.

Selecting the input video signal types (see page 4-6(E))
When recording, set the VIDEO IN selector switches on the subsidiary control panel to match the type of video input signal. Note that when inputting component video signals you must set both the upper and lower VIDEO IN selector switches properly. If these switches are not set to the correct positions, pictures will not appear on the monitor and recording is impossible.

Setting the cassette record-inhibit plug (see page 3-4(E))
Recording on a cassette is impossible when its record-inhibit plug is pushed in. If the record-inhibit plug is pushed in on the cassette you are going to use, either use a new tape, or pull out the plug and use the tape after making sure that it contains no important material.

Controlling tape transport remotely (see page 7-3(E))
The tape transport buttons on this unit are normally disabled when the REMOTE indicator is lit. However, you can use these buttons if you set the LOCAL ENABLE menu item to ALL ENABLE. The factory default setting for this item is STOP & EJECT.

Storing in a rack
When installing this unit in a standard 19-inch rack, you can stack up to three units in one rack. When stacking four or more units, be sure to leave space equivalent to one unit height, or 44.45 mm (1 3/4 inches) between units.

Chapter 1
Overview

This chapter overviews the features of this unit.

Features .... 1-2 (E)

Features

The UVW-1700G/1700GP is a Betacam SP videocassette recorder, capable of recording and playing back composite video, component video and analog audio signals.
The UVW-1700G is for the NTSC system, and the UVW-1700GP is for the PAL system. The descriptions and explanations in this manual are common to both the UVW-1700G and UVW-1700GP unless otherwise indicated.

Betacam SP format

Excellent video and audio performance

The Betacam SP format provides superior video and audio performance, with an improved signal-to-noise ratio, better frequency response and improved reproduction of details, for greatly enhanced video and audio quality.

Compatibility with other Betacam SP VTRs

A metal tape cassette recorded on this unit can also be played back on other Betacam SP VTRs[1]. Again metal tape cassettes recorded on other Betacam SP VTRs can be played back on the UVW-1700G/1700GP. The cassette size is detected automatically.

Full range of recording and playback functions

RGB signal recording and playback

Direct input and output of RGB signals is possible. You can either use an RGB signal including a sync signal or input or output an independent sync signal.

Built-in time code generator and reader

The built-in time code generator allows the unit to record time codes (LTC or user's bits) simultaneously with the video and audio signals. The built-in time code reader allows the unit to read time codes (LTC or user's bits) from a tape.

Built-in time base stabilizer (TBS)

The built-in time base stabilizer allows you to obtain a stable playback picture with no horizontal jitter or color fluctuation.

Microprocessor servo system

Four microprocessor-controlled DC motors provide direct drive for the drum, capstan and reels, enabling quick and accurate tape access.

Audio noise reduction

Longitudinal audio tracks 1 and 2 use the same Dolby C-type noise reduction[2] as a conventional Betacam SP System. These circuits are always operating when recording or playing back.

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1) Because this unit does not record the AFM carrier wave, noise may be heard when tapes recorded on this unit are played back by other VTRs in the BVW series. If necessary, lower the audio levels of channels 3 and 4 on the other VTR.

2) Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol DD are trademarks of Dolby Laboratories Licensing Corporation.

Remote control function

The unit can be operated from a computer unit through the RS-232C or RS-422A serial interface. It is also possible to use the CONTROL S connector on the front panel to connect a simple remote control unit (SIRCS type remote control unit such as an SVRM-100/100A) to carry out search operations.
Using a computer or remote control unit adds the following functions to the capability of the unit.

Video editing function

By connecting a computer or RM-450/PVE-500 editing control unit or other editor to the RS232C/RS422A REMOTE connectors it becomes possible to use the unit for video editing (but not audio editing). For example, using two UVW-1700G/1700GP units with a computer and an editor connected, it is possible to carry out insert editing with images from the computer. A menu operation selects whether to use the RS-232C or RS-422A interface.

Triggering a video printer

By connecting the REMOTE OUT connector on the rear panel to the REMOTE 2 connector of a Sony UP-5000/7000-series or other video printer, you can automatically output a desired frame on the video printer by pressing the FREEZE button on an SVRM-100/100A remote control unit. Use a menu operation to set the output timing according to the video printer being used.

Other features

Compact, power-saving design

The unit is light and simple, and very energy-efficient.

Menu system

All the initial settings for system operation conditions and so forth are accessed through a simple menu system, from the subsidiary control panel.

Digital hours meter

The digital hours meter keeps cumulative totals of four values: the total hours powered on, the drum rotation time, the tape running time, and the numbering of threading/unthreading operations. These are displayed as superimposed text on the video monitor.

Superimposed text output

The VIDEO 2 (SUPER) OUTPUT connector provides a monitor video output which can have various information (time codes, tape speed, system settings, etc.) superimposed on it. The superimpose function can be enabled or disabled as required.

S-video connectors

With VTRs or other peripheral equipment having S-video connectors, these connectors provide a high-grade interface for video signal transfer.

Features

Self-diagnostics

If an operating fault occurs, the system attempts to diagnose the problem, and produces an error code on the time counter display and superimposed video output.

Alarm indications

If a misoperations or faulty connections are made, the system superimposes information on the monitor screen giving nature of the error and actions to be taken. The cause of the problem is also indicated in the time counter display.

Chapter 2
Location of Parts and Controls

This chapter lists the names of all the controls and other components used in the operation of the unit.

Front Panel ....2-2 (E)
Rear Panel ....2-5 (E)

Front Panel

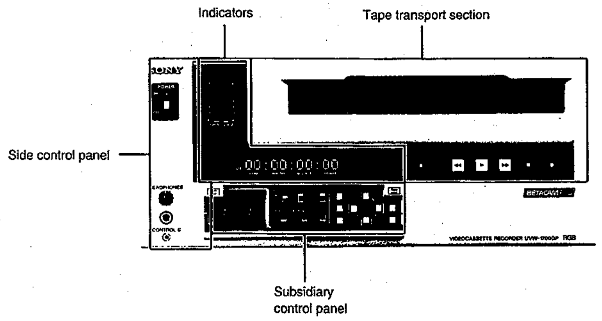
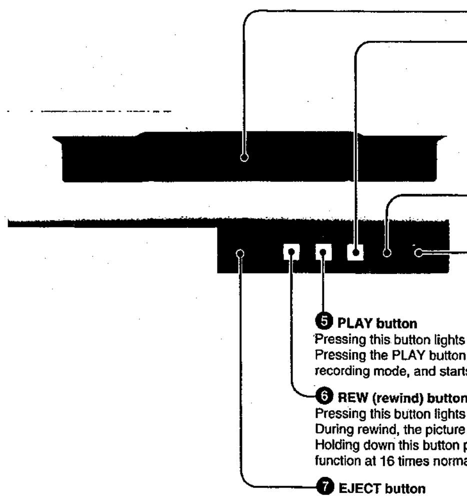


Photo: UVW-1700GP

Front Panel

Tape transport section



❶ **Cassette insertion aperture**

❷ **F FWD (fast forward) button**
Pressing this button lights the indicator and fast forwards the tape. In fast forward, the picture does not appear on the monitor. Holding down this button provides a monochrome search function at 16 times normal speed in the forward direction.[a]

❸ **STOP button**
Pressing this button stops the tape transport.

❹ **REC (record) button**
Holding down this button while pressing the PLAY button lights the indicator and starts recording.

❺ **PLAY button**
Pressing this button lights the indicator and starts playback. Pressing the PLAY button during the recording ends the recording mode, and starts playback.

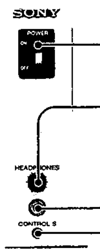
❻ **REW (rewind) button**
Pressing this button lights the indicator and rewinds the tape. During rewind, the picture does not appear on the monitor. Holding down this button provides a monochrome search function at 16 times normal speed in the reverse direction.[a]

❼ **EJECT button**
Pressing this button lights the indicator, and a few seconds later the cassette is ejected.

a) The F.FWD/REW item under the AUTO EE SELECT menu item must be set to PB *(see page 7-3(E))*.

Tape transport section

Side control panel



⑧ **POWER switch**
Pressing this switch on the side marked "ON" powers on the unit. The audio level meters and time counter display light.

⑨ **HEADPHONES level control**
Adjusts the headphone volume.

⑩ **HEADPHONES connector (stereo phone jack)**
Connect headphones (8 Ω) to monitor recording and playback audio on the unit.

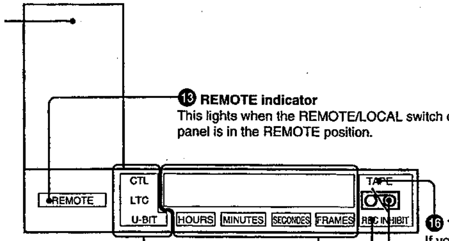
⑪ **CONTROL S connector (Stereo mini-jack)**
Connect an optional remote control unit such as the SVRM-100/100A to this connector to allow remote control of the unit.

Note

Unless the LOCAL ENABLE menu item is set to ALL ENABLE, the tape transport buttons are disabled whenever the REMOTE indicator is lit.

Side control panel

Indicators



⑫ **Audio level meters**
In recording or EE mode these indicate the recording audio level, while during playback they indicate the playback audio level.

⑬ **REMOTE indicator**
This lights when the REMOTE/LOCAL switch on the subsidiary control panel is in the REMOTE position.

⑭ **Time data indicators**
These indicate the type of time data shown in the time counter display.

⑮ **Time counter display**
This shows a CTL signal count value (hours:minutes:seconds:frames), longitudinal time code (LTC), or user's bit data. In combination with the HOURS METER button on the subsidiary control panel, it is also used to display the hours meter data selected from the menu.

If an error code indication in the form "Errorxx-xxx" appears in the time counter display, consult your Sony service representative.

⑯ **TAPE indicator**
If you insert an oxide tape cassette, this indicator flashes. Press the EJECT button, and remove the cassette.
The UVW-1700GP automatically ejects oxide tapes.

⑰ **Tape end indicator (⊠)**
When there is only about 2 minutes of tape remaining, this indicator flashes.

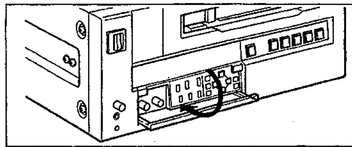
⑱ **REC INHIBIT indicator**
This indicator lights when the cassette loaded has the record inhibit plug set to inhibit recording.

Indicators

Front Panel

Subsidiary control panel

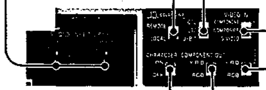
The subsidiary control panel is behind a flap on the front panel. Open the flap as shown in the figure.



Pull the flap forward and down, then push into the panel.

Accessing the subsidiary control panel

Switches and Controls



㉔ **AUDIO INPUT LEVEL controls**
These adjust the audio input levels for each of channels 1 and 2 when recording.

⑲ **REMOTE/LOCAL switch**
Selects whether the unit is controlled remotely from a device connected to the REMOTE connector on the rear panel, or locally from the control panel.

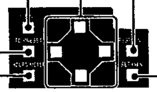
⑳ **CTL/LTC/U-BIT switch**
Selects the type of time data (CTL, LTC or user's bits) displayed.

㉑ **VIDEO IN selector switches**
Select the type of video input signal for recording or playing back a component signal (the Y-R,B or RGB position), a composite signal (COMPOSITE position), or an S-video signal (S-VIDEO position).

㉒ **COMPONENT OUT selection switch**
Selects R/G/B signals or Y/R–Y/B–Y signals for output from the RGB/COMPONENT connectors.

㉓ **CHARACTER switch**
Determines whether or not character information such as time codes is superimposed on the video output signal from the VIDEO 2 (SUPER) OUTPUT connector.

Menu Control, Time Code and Digital Hours Meter Button



㉙ **TC (time code) PRESET button**
Press this button to preset the LTC or user's bit value shown on the time counter display.
For details of how to set time code values, see the section "Setting Longitudinal Time Code and User's Bits" (page 6-3(E)).

㉚ **HOURS METER button**
Pressing this button switches the information superimposed on the monitor screen to show the digital hours meter values. The time counter display also shows the hours meter information at the same time. Pressing the button again returns to the normal indications.
For details of the digital hours meter, see the section "Digital Hours Meter" (page 8-4(E)).

㉕ **MENU button**
Pressing this button displays menu options on the monitor screen and the time counter display. Pressing the button again returns to normal operating mode.
For details of menu operations, see the section "Menu Operations" (page 7-9(E)).

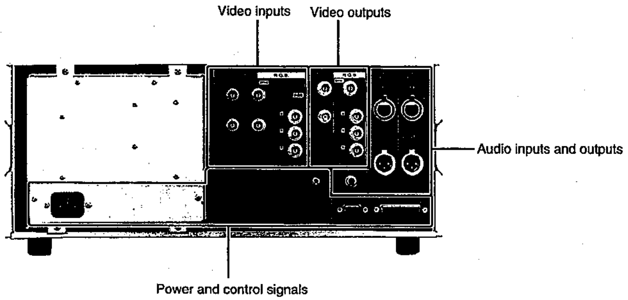
㉖ **Arrow direction (↑ ↓ ← →) buttons**
Use these buttons to move around the menu settings, for setting time code values .
For details of how to set time code values, see the section "Setting Longitudinal Time Code and User's Bits" (page 6-3(E)).

㉗ **RESET (NO) button**
This button resets menu settings to their factory defaults, resets a time code value to zero, and is also used for a negative response to a menu question.

㉘ **SET (YES) button**
This button confirms new menu or time code settings. It is also used for a positive response to a menu question.

Subsidiary control panel

Rear Panel



Rear Panel

Video inputs

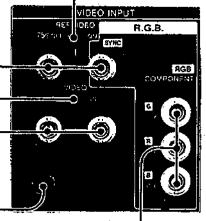
❶ REF. (reference) VIDEO 75 Ω termination switch
Set this switch to the OFF position when using both REF. VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.

❷ REF. (reference) VIDEO INPUT connectors (BNC)
Input a reference video signal or a composite sync signal (not a black burst signal). The two connectors can be used for a loop-through connection.

❸ VIDEO 75 Ω termination switch
Set this switch to the OFF position when using both VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.

❹ VIDEO INPUT connectors (BNC)
Input a composite video signal. The two connectors can be used for a loop-through connection.

❺ S-VIDEO INPUT connector (4-pin)
Input an S-video signal (separated video: luminance and chrominance (UVW-1700G: 3.58 MHz, UVW-1700GP: 4.43 MHz signals).



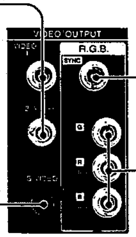
❻ RGB/COMPONENT INPUT connectors (BNC)
Connect separate component video input signals (RGB or Y, R–Y and B–Y).

Video inputs

Video outputs

❼ VIDEO 1 and 2 (SUPER) OUTPUT connectors (BNC)
Output composite video signals. When the CHARACTER switch on the subsidiary control panel is in the ON position, character information is superimposed on the video signal output from the VIDEO 2 (SUPER) OUTPUT connector.

❽ S-VIDEO OUTPUT connector (4-pin)
Outputs an S-video signal (separated video: luminance and chrominance (UVW-1700G: 3.58 MHz, UVW-1700GP: 4.43 MHz) signals).



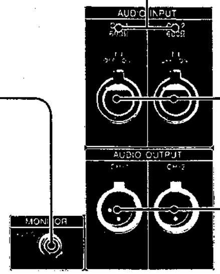
❾ RGB SYNC OUTPUT connector (BNC)
This outputs a composite sync signal (not a black burst signal).

❿ RGB/COMPONENT OUTPUT connectors (BNC)
Output separate component video signals (RGB or Y, R–Y and B–Y).

Video outputs

Audio inputs and outputs

⓮ MONITOR AUDIO connector (RCA)
Outputs an audio signal for the video monitor.



⓫ AUDIO INPUT 600 Ω ON/OFF switch
Sets the input impedance of audio input channels 1 and 2 to 600 Ω (ON position) or to 1 kΩ (OFF position).

⓬ AUDIO INPUT CH-1 and CH-2 connectors (XLR 3-pin)
Connect audio input signals from a video deck or from audio equipment.

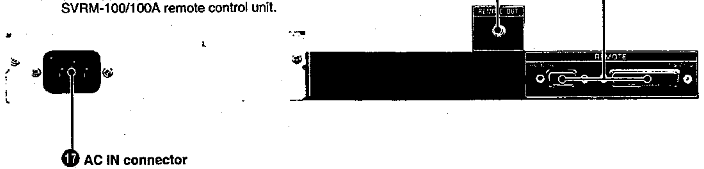
⓭ AUDIO OUTPUT CH-1 and CH-2 connectors (XLR 3-pin)
Output audio signals.

Audio inputs and outputs

Power and control signals

⑮ **RS232C/RS422A REMOTE connectors (25-pin/9-pin)**
Connect to a computer with a 25-way remote control cable or to an RM-450/PVE-500 or other editor with a 9-way remote control cable. Use the "REMOTE I/F" menu item to select whether an RS-232C or RS-422A interface is used *(see page 7-8(E))*. The default selection when shipped is RS-232C.

⑯ **REMOTE OUT connector (stereo mini-jack)**
By connecting this connector to the REMOTE 2 connector of a Sony UP-5000/7000-series or other video printer using an RK-G34 cable (not supplied), you can control video printer output with an SVRM-100/100A remote control unit.



⑰ **AC IN connector**
Use the supplied power cord to connect to an AC power supply.

Power and control signals

Chapter 3
Preparations

This chapter describes various preparatory aspects of operation of this unit.

Before Use .... 3-2 (E)
Cassettes .... 3-3 (E)
  Usable Cassettes .... 3-3 (E)
  Inserting and Ejecting a Cassette .... 3-3 (E)
  Record Inhibit Function .... 3-4 (E)
Reference Video Signals .... 3-5 (E)

Before Use

Safety notes

Power supply

- Ensure that the unit is connected to a power supply of the correct rating.
- Do not place any heavy objects on the power cord, and be careful not to damage the power cord. Using a damaged power cord is dangerous.
- When disconnecting the power cord, not pull the cord itself, hold the plug while pulling it out.

Do not disassemble the unit

Do not remove the casing. If you insert your hand there is a danger of electric shock.

Do not drop foreign objects into the casing

If flammable objects, metal objects, water or other undesirable substances enter the casing, this can be a cause of malfunction.

In the event of a malfunction

If there should be a strange sound or smell or smoke emanating from the unit, immediately power off the unit, and disconnect the power supply and all signal connections, then refer to your supplier or Sony service representative.

Notes on operation

Operation and storage locations

Avoid operation or storage in any of the following places.

- Locations subject to extremes of temperature (operating temperature range 5 °C to 40 °C (41 °F to 104 °F))
- Locations subject to direct sunlight for long periods, or close to heating appliances (Note that the interior of a car left in summer with the windows closed can exceed 50 °C (122 °F)).

Operate the unit in a horizontal position

This unit is designed to be operated in a horizontal position. Do not operate it on its side, or tilted through an excessive angle (exceeding 20 °).

Avoid violent impacts

Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

Do not obstruct ventilation openings

To prevent the unit from overheating, do not obstruct the ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

Care

If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of extreme dirt, use a cloth steeped in a neutral detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinners, insecticides, or other volatile solvents may result in deforming the casing or damaging the finish.

Shipping

- Always remove the cassette before shipping the unit.
- Pack the unit in its original carton or equivalent packing, and take care not to impart violent shocks in transit.

Cassettes

Usable Cassettes

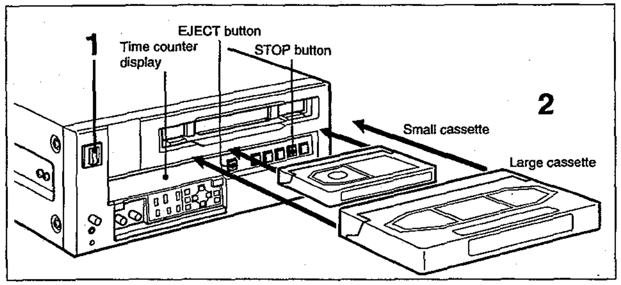
This unit only accepts metal tapes.
Use the following $^1/_2$-inch Betacam SP cassettes.

	Metal tape
Small (S) cassettes	BCT-5MA/10MA/20MA/30MA, UVWT-10MA/20MA/30MA
Large (L) cassettes	BCT-5MLA/10MLA/20MLA/30MLA/60MLA/90MLA, UVWT-60MLA/90MLA

Inserting and Ejecting a Cassette

Always check that the unit is powered on before attempting to insert or eject a cassette.

Inserting a cassette



Inserting a cassette

1 Turn the POWER switch on.

2 Check the following points, then insert the cassette.
- The cassette must be inserted with the side that the tape is visible uppermost.
- There must be no slack in the tape.
- There must be no message "HUMID !" in the time counter display.

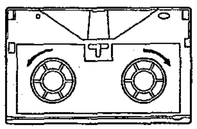
For details of how to remove slack in the tape, see the section "Removing slack in the tape" on the next page .

If the message "HUMID !" appears in the time counter display, see the section "Condensation" (page 8-3(E)).

To insert a small cassette, align it with the marks on the cassette compartment.

The cassette is automatically drawn into the unit, and the tape wound round the head drum. The tape is stationary while the head drum rotates, and the STOP button lights.

Removing slack in the tape
Carefully rotate one of the reels with your finger in the direction of the arrows until it stops.



Removing slack in the tape

No double insertion of cassettes
When you insert a cassette, the orange lock-out plate appears in the cassette compartment to prevent double insertion.

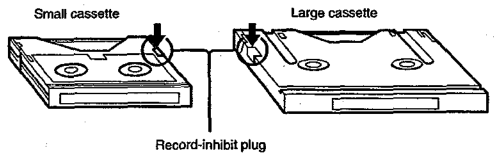
Ejecting the cassette

Press the EJECT button.

The tape is wound back into the cassette (this takes several seconds), and then the cassette is ejected from the unit.
If the time counter display is showing CTL values, it is reset.

Record Inhibit Function

To protect recorded material which you wish to keep, press in the record-inhibit plug on the cassette.



Record-inhibit plug

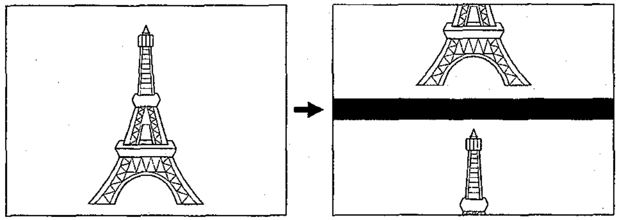
When you insert a cassette with the record-inhibit plug pushed in into the cassette compartment, the REC INHIBIT indicator lights, and it is not possible to record.

To re-record on the cassette, return the record-inhibit plug to its original position.

Reference Video Signals

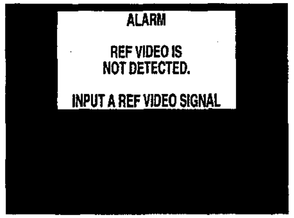
In oder to enable the time base stabilizer (TBS) to operate correctly, and ensure stable operation, you must input a composite video signal synchronized to the signal being used to the REF. VIDEO INPUT connector.

If no reference video signal is input, then during recording or in EE mode the monitor screen will tend to drift vertically, as shown in the figure below.



With reference video   No reference video

The monitor screen and the time counter display also show alarm messages. (Example: When the VIDEO 2 (SUPER) OUTPUT connector is used with the REF. ALARM set to "ON" in the menu.)

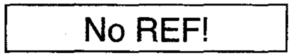


ALARM

REF VIDEO IS
NOT DETECTED.

INPUT A REF VIDEO SIGNAL

Monitor screen



No REF!

Time counter display

During playback, a monitor picture is normally stable without a reference video signal input.

For details of changing the menu settings, see the section "Menu Operations" (page 7-9(E)).

Using RGB signals

Input

Input a sync signal synchronized to the RGB signal into the REF. VIDEO INPUT connector whether the RGB signal includes a sync signal or not.

Output

You can select in a menu whether or not to add a sync signal to the green signal. In either case the signal output from the RGB SYNC OUTPUT connector is always a composite sync signal (no burst signal).

For details of menu settings, see the item "SYNC ON GREEN" (page 7-7(E)) in Chapter 7 "Menus."

Chapter 4
Playback and Recording

This chapter describes the preparation necessary before using the unit for playback and recording, including connections and switch settings, and operating procedures. It also describes the text information which can be superimposed on the monitor screen.

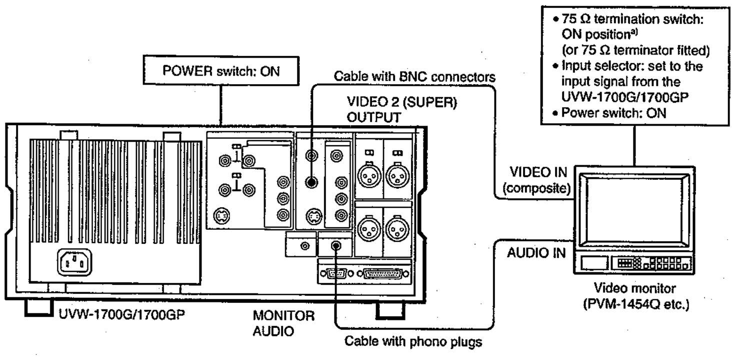
Playback ....**4-2 (E)**
  Preparation for Playback..4-2 (E)
  Playback Operation..4-3 (E)
  Triggering a Video Printer..4-4 (E)
Recording ....**4-5 (E)**
  Preparation for Recording..4-5 (E)
  Recording Operation..4-7 (E)
Superimposed Text Information ....**4-8 (E)**

Playback

This section describes the connections, switch settings, and basic operating procedures for playback of both video and audio signals.

Preparation for Playback

Connect the unit to the monitor and make the switch settings as shown in the following figure.

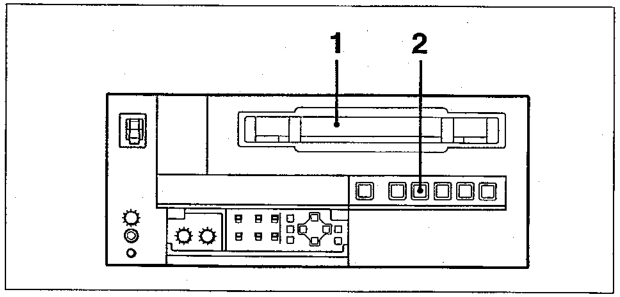


POWER switch: ON
Cable with BNC connectors
VIDEO 2 (SUPER) OUTPUT
• 75 Ω termination switch: ON position[a] (or 75 Ω terminator fitted)
• Input selector: set to the input signal from the UVW-1700G/1700GP
• Power switch: ON
VIDEO IN (composite)
AUDIO IN
Video monitor (PVM-1454Q etc.)
UVW-1700G/1700GP
MONITOR AUDIO
Cable with phono plugs

a) The VIDEO IN connectors of PVM-1454Q are provided with automatic termination function.

Connections and switch settings

Playback Operation



Playback

1 Insert **a metal tape** cassette.

The STOP button lights, then a few seconds later the tape is ready to start running. At this point a still picture appears on the monitor.
Always be sure to use a metal tape.

2 Press the PLAY button.

Playback begins.

To stop playback

Press the STOP button.

This puts the UVW-1700G/1700GP into stop mode. This unit automatically enters standby-off mode if it is left in stop mode for eight minutes.

You can change the time to switch to stand-by off mode in the TAPE PROTECTION menu. For details, see under "TAPE PROTECTION" (page 7-6(E)).

If the tape reaches the end during playback

The tape is automatically rewound to the beginning and the unit stops.
You can disable this automatic rewind function using the menu.

For details, see "AUTO REW" (page 7-4(E)).

Adjusting the audio playback volume

Carry this out on the monitor.

Simple search function

With the F.FWD/REW item in the AUTO EE SELECT of OPERATIONAL FUNCTION menu set to PB, holding down the F FWD or REW button provides a monochrome search function at 16 times normal speed in the foward or reverse direction respectively. Press the PLAY button again to return to normal playback.

Triggering a video printer

When using a Sony UP-5000/7000-series or other video printer, by connecting the REMOTE OUT connector on the rear panel to the REMOTE 2 connector of the printer, you can control video printer output with an optional SVRM-100/100A remote control unit.

1 Connect the SVRM-100/100A, printer, monitor and any other equipment to this unit. Connect the REMOTE OUT connector to the REMOTE 2 connector of the printer, using an RK-G34 cable (not supplied).

For details of the basic connections between this unit and the video printer, refer to the operating instructions for the printer.

2 Set the output timing according to the type of printer connected, by a menu selection.

For details of the output timing settings, see the item "VIDEO PRINTER" (page 7-8(E)) in Chapter 7 "Menus."

3 Display the frame to be printed as a still picture in jog/shuttle mode or by pausing.

4 Press the FREEZE button on the SVRM-100/100A.

This unit carries out a preroll and playback sequence, and outputs the specified frame to the video printer.

Triggering a video printer during playback

1 Carry out step **1** in the preceding procedure.

2 Press the PLAY button on the SVRM-100/100A.

This starts playback on this unit.

3 Press the FREEZE button on the SVRM-100/100A when the frame to be printed appears on the monitor.

This outputs the specified frame to the video printer.

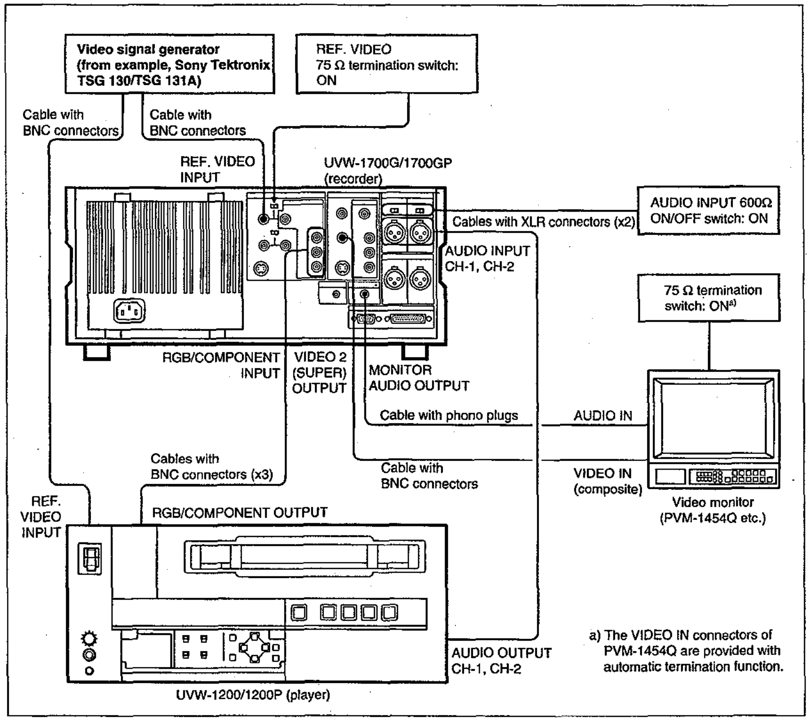
For details, refer to the Operating Instructions for the SVRM-100 or SVRM-100A.

Recording

This section describes the connections, switch settings, and operating procedures for recording a component video signal and audio signal.

Preparation for Recording

Connect this unit as the recorder and a UVW-1200/1200P as the player as shown in the following figure. To check the video and audio signals being recorded, connect this unit to a monitor as described in the section "Playback" *(page 4-2(E))*.


Video signal generator (from example, Sony Tektronix TSG 130/TSG 131A)
REF. VIDEO 75 Ω termination switch: ON
Cable with BNC connectors
Cable with BNC connectors
REF. VIDEO INPUT
UVW-1700G/1700GP (recorder)
Cables with XLR connectors (x2)
AUDIO INPUT 600Ω ON/OFF switch: ON
AUDIO INPUT CH-1, CH-2
75 Ω termination switch: ON^a)
RGB/COMPONENT INPUT
VIDEO 2 (SUPER) OUTPUT
MONITOR AUDIO OUTPUT
Cable with phono plugs
AUDIO IN
Cables with BNC connectors (x3)
Cable with BNC connectors
VIDEO IN (composite)
Video monitor (PVM-1454Q etc.)
REF. VIDEO INPUT
RGB/COMPONENT OUTPUT
AUDIO OUTPUT CH-1, CH-2
UVW-1200/1200P (player)

a) The VIDEO IN connectors of PVM-1454Q are provided with automatic termination function.

Connections

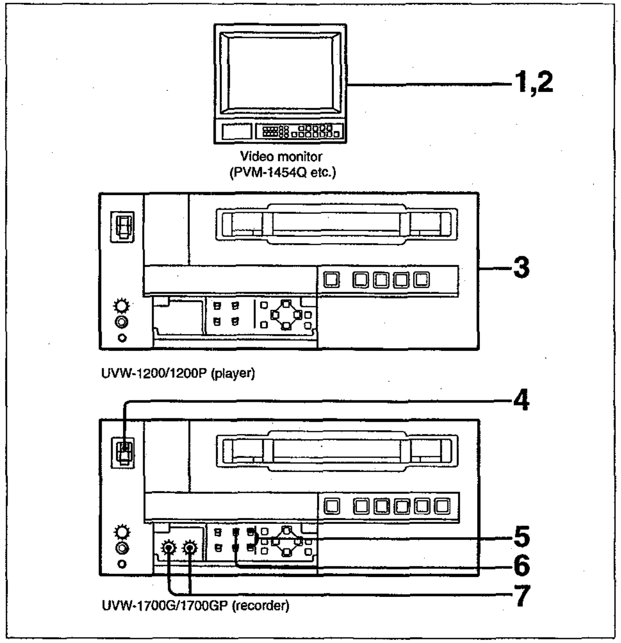
Note

If you do not input a reference video signal, the monitor picture will be subject to vertical instability. When carrying out recording, always input a reference video signal.

For details of reference video signals, see the section "Reference Video Signals" (page 3-5(E)).

Switch and control settings

After completing the connections, make the switch and control settings as follows.


Video monitor (PVM-1454Q etc.)
1,2
3
UVW-1200/1200P (player)
4
5
6
7
UVW-1700G/1700GP (recorder)

Switch and control settings

1 Power on the video monitor.

2 Set the input selector of the monitor to the input connector connected to the UVW-1700G/1700GP.

3 Following the instructions in the appropriate operation manual, and prepare the player for playback.

4 Power on the UVW-1700G/1700GP.

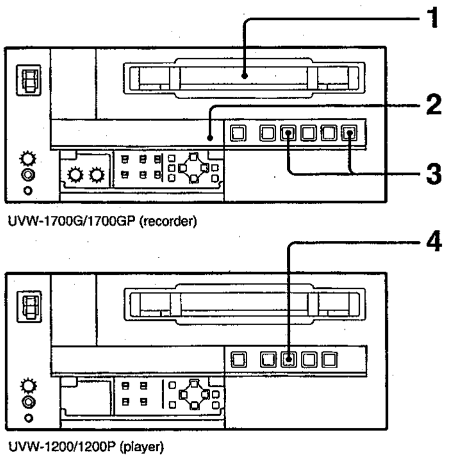
5 Set the upper VIDEO IN selector switch to COMPONENT, and the lower VIDEO IN selector switch to Y-R, B.

6 Set the CTL/LTC/U-BIT switch according to the time data to be used.

7 Adjust the AUDIO INPUT LEVEL controls so that the audio level meters indicate around 0 VU when the audio signal is at its maximum.

Recording Operation

In order to carry out recording of the video and audio signals, check that you have made the connections and carried out the switch setting procedure correctly, then use the following procedure.



Recording

1 Insert a cassette in the UVW-1700G/1700GP.

Always be sure to use **a metal tape.**
Before inserting the cassette, check that it is not record-inhibited.

For details see the section "Record Inhibit Function" (page 3-4(E)).

2 Check that the REC INHIBIT indicator is not lit.

3 Hold down the REC button, and press the PLAY button.

Recording starts.

4 Press the PLAY button on the player.

Playback starts.

To stop recording
Press the STOP button.

Superimposed Text Information

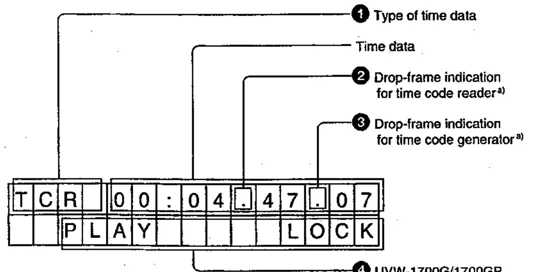
When the subsidiary control panel CHARACTER switch is in the ON position, the video signal output from the VIDEO 2 (SUPER) OUTPUT connector includes superimposed indications of time data and the operating state of this unit.

Selecting the information displayed and the character type and position of the indications

The information displayed and the character type and position of the indications can be selected by using the menu item "DISPLAY CONTROL." The factory default settings are as follows.

Information displayed : Time data selected by the CTL/LTC/U-BIT switch, and the operating status of the unit
Character type : White characters on a black background
Character position : Bottom center of the screen

For details of the setting method, see under "DISPLAY CONTROL" (page 7-4(E)).


❶ Type of time data
Time data
❷ Drop-frame indication for time code reader a)
❸ Drop-frame indication for time code generator a)
T C R 0 0 : 0 4 . 4 7 . 0 7
P L A Y L O C K
❹ UVW-1700G/1700GP operating status

a) This character can appear on the UVW-1700G only. The character to appear in these two columns is always a colon (:) on the UVW-1700GP.

Displayed information (factory default)

❶ Type of time data

This indicates the type of time data as follows.

Indication	Meaning
CTL	CTL counter data
TCR	LTC reader data
UBR	LTC reader user's bit data
TCG	Time code data from time code generator
UBG	User's bit data from time code generator
T*R	Time code data from time code reader. Interpolated by the time code reader to make up for the time code data not correctly read from the tape.
U*R	User's bit data from time code reader. Last data is retained by the time code reader, as the new data has not been read correctly from the tape.

② Drop-frame indication for time code reader (on UVW-1700G only)

“ . ” : A single dot indicates drop-frame mode.
“ : ” : Two dots (i.e. a colon) indicate non-drop-frame mode.

③ Drop-frame indication for time code generator (on UVW-1700G only)

“ . ” : A single dot indicates drop-frame mode.
“ : ” : Two dots (i.e. a colon) indicate non-drop-frame mode.

④ UVW-1700G/1700GP operating status

Indication	Operating status
THREADING	Cassette is inserted, and tape is being threaded.
UNTHREADING	Tape is being unthreaded to eject cassette.
CASSETTE OUT	No cassette is inserted.
STANDBY OFF	Tape is not on standby.
T.RELEASE	Tape tension is released.
STOP	Tape is stopped.
F.FWD	Fast forward
REW	Rewind
PREROLL	Preroll
PLAY	Play (servo not locked)
PLAY LOCK	Play (servo locked)
PLAY PAUSE	Playback pause
REC	Recording (servo not locked)
REC LOCK	Recording (servo locked)
REC PAUSE	Recording pause
JOG STILL	Still picture in jog mode
JOG FWD	Jog mode in forward direction (▶ indicator lights)
JOG REV	Jog mode in reverse direction (◀ indicator lights)
SHUTTLE (speed)	Shuttle mode (playback speed)
PAUSE	Shuttle mode playback pause

Chapter 5
Editing

It is possible to use two UVW-1700G/1700GP units for video editing (but not audio editing), by connecting a computer or RM-450 editing control unit or other editor, or equally to use one UVW-1700G/1700GP unit together with another unit such as a UVW-1600/1600P.
This chapter describes the connections for a cut editing system using an RM-450/PVE-500.

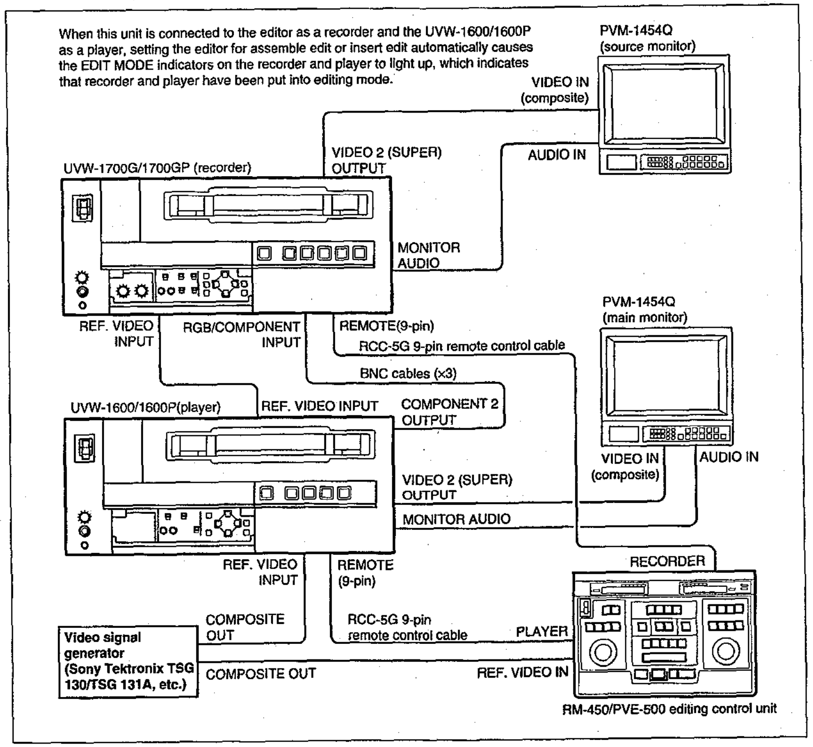
Cut Editing .... 5-2 (E)

Cut Editing

The figure below illustrates a system for cut editing using this unit with a UVW-1600/1600P.

For details of editing operations, refer to the operation manual for the editor being used.

For details of the connections and settings on each of the other pieces of equipment, refer to the respective operation manuals.


When this unit is connected to the editor as a recorder and the UVW-1600/1600P as a player, setting the editor for assemble edit or insert edit automatically causes the EDIT MODE indicators on the recorder and player to light up, which indicates that recorder and player have been put into editing mode.

PVM-1454Q
(source monitor)
VIDEO IN
(composite)
AUDIO IN
UVW-1700G/1700GP (recorder)
VIDEO 2 (SUPER)
OUTPUT
MONITOR
AUDIO
REF. VIDEO
INPUT
RGB/COMPONENT
INPUT
REMOTE(9-pin)
RCC-5G 9-pin remote control cable
BNC cables (×3)
PVM-1454Q
(main monitor)
UVW-1600/1600P(player)
REF. VIDEO INPUT
COMPONENT 2
OUTPUT
VIDEO IN
(composite)
AUDIO IN
VIDEO 2 (SUPER)
OUTPUT
MONITOR AUDIO
RECORDER
REF. VIDEO
INPUT
REMOTE
(9-pin)
COMPOSITE
OUT
RCC-5G 9-pin
remote control cable
PLAYER
Video signal
generator
(Sony Tektronix TSG
130/TSG 131A, etc.)
COMPOSITE OUT
REF. VIDEO IN
RM-450/PVE-500 editing control unit

Example configuration of system for cut editing (component signals)

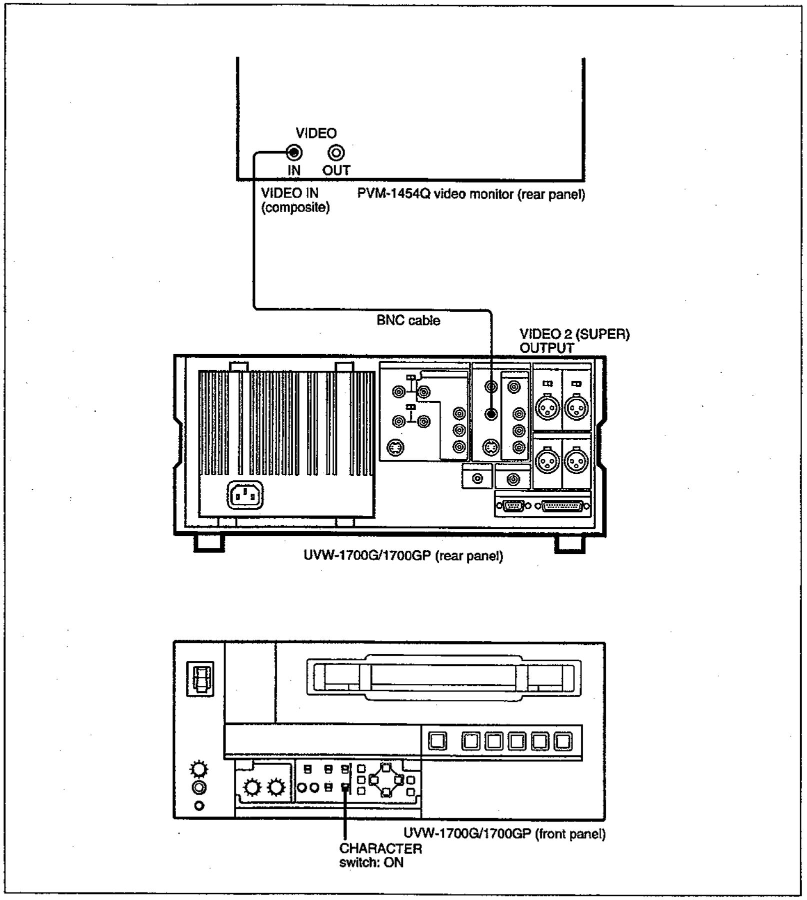
Switch settings on the UVW-1700G/1700GP (recorder) and UVW-1600 /1600P (player)

Switches	UVW-1700G/1700GP	UVW-1600/1600P
REMOTE/LOCAL switch	REMOTE	REMOTE
VIDEO IN selector switch	Y-R, B	–
REF. VIDEO 75 Ω termination switch	ON	OFF

Monitoring the video signals

To monitor the video signals, connect monitors as shown in the figure below. The connections are the same for the recorder and player.

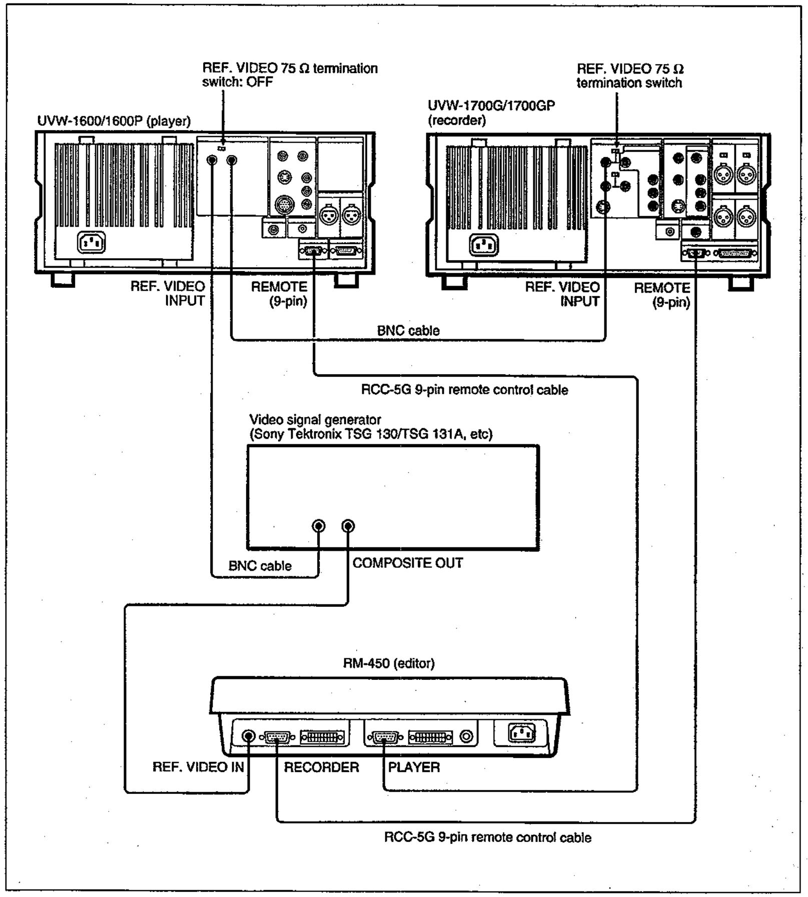
To obtain superimposed information on the monitor screen, set the CHARACTER switch to the ON position.


VIDEO
IN
OUT
VIDEO IN
(composite)
PVM-1454Q video monitor (rear panel)
BNC cable
VIDEO 2 (SUPER)
OUTPUT
UVW-1700G/1700GP (rear panel)
UVW-1700G/1700GP (front panel)
CHARACTER
switch: ON

Connecting a video monitor

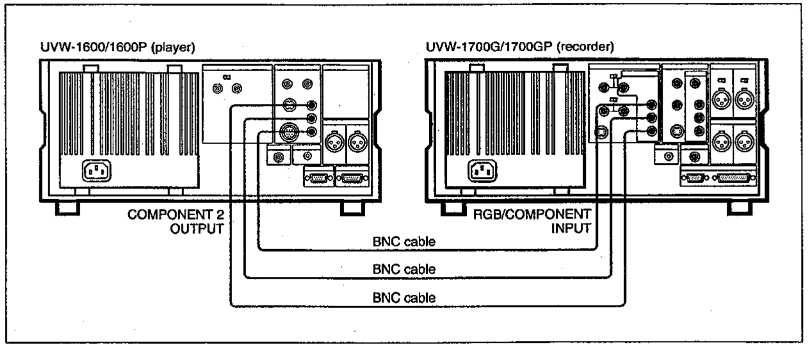
Cut Editing

Reference video signal and editor connections


REF. VIDEO 75 Ω termination
switch: OFF
REF. VIDEO 75 Ω
termination switch
UVW-1600/1600P (player)
UVW-1700G/1700GP
(recorder)
REF. VIDEO
INPUT
REMOTE
(9-pin)
REF. VIDEO
INPUT
REMOTE
(9-pin)
BNC cable
RCC-5G 9-pin remote control cable
Video signal generator
(Sony Tektronix TSG 130/TSG 131A, etc)
BNC cable
COMPOSITE OUT
RM-450 (editor)
REF. VIDEO IN
RECORDER
PLAYER
RCC-5G 9-pin remote control cable

Reference video signal and editor connection

Video signal connections


UVW-1600/1600P (player)
UVW-1700G/1700GP (recorder)
COMPONENT 2 OUTPUT
RGB/COMPONENT INPUT
BNC cable
BNC cable
BNC cable

Video signal connection

Chapter 6
Time Data

The time data used by this unit for both recording and display include CTL signal count values, longitudinal time code (LTC), and user's bit data. This chapter describes how to display time data, and how to set LTC and user's bit values.

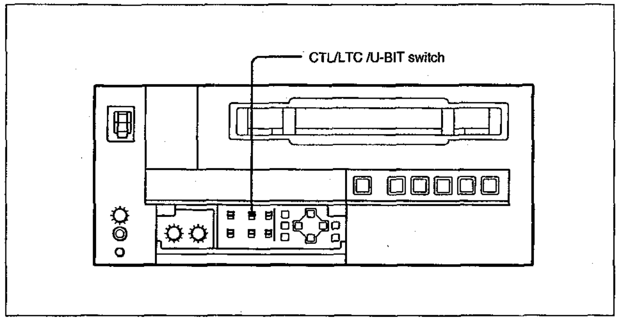
Displaying Time Data .... 6-2 (E)
Setting Longitudinal Time Code and User's Bits .... 6-3 (E)

Displaying Time Data

During recording or playback, you can display the time data selected on this unit on the monitor and on the time counter display.

On the time counter display

Use the CTL/LTC/U-BIT switch to select the data to be displayed on the time counter display.



CTL/LTC/U-BIT switch

Resetting the CTL data displayed

Press the RESET (NO) button.

The indication in the time counter display is reset to "0:00:00:00".

On the monitor screen

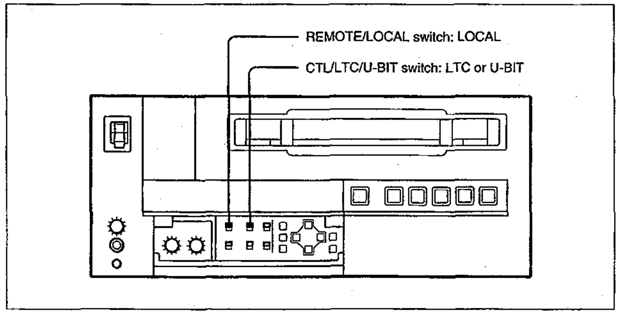
See the section "Superimposed Text Information" (page 4-8(E)).

Setting Longitudinal Time Code and User's Bits

Using the internal time code generator it is possible to preset the longitudinal time code (LTC) value to be recorded on the tape to any desired initial value.
This section describes how to preset the LTC value, and also how to preset the user's bit data which is also written on the same track.

Switch and menu settings

Carry out the following switch and menu settings.


REMOTE/LOCAL switch: LOCAL
CTL/LTC/U-BIT switch: LTC or U-BIT

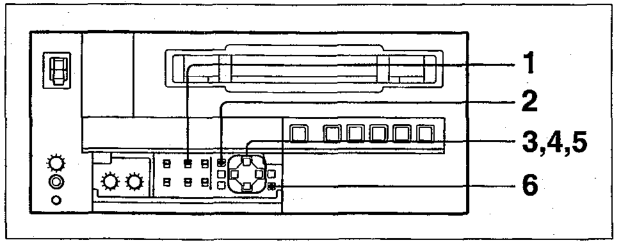
Switch settings

Menu settings

Mode	Setting
RUN MODE	"FREE RUN" or "REC RUN"
DF MODE (for UVW-1700G only)	Normally "DF"

For details of the RUN MODE and DF MODE settings, see under "TIME CODE" (page 7-5(E)).

Setting procedure



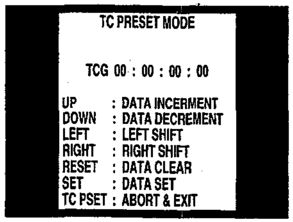
Setting the initial value for time code or user's bits

1 Set the CTL/LTC/U-BIT switch to LTC or U-BIT, to display the required time data on the monitor and time counter display.

2 Press the TC PRESET button.

The current setting is displayed on the monitor screen and the time counter display. At this point the leftmost digit flashes.

One of the following displays appears on the monitor screen.

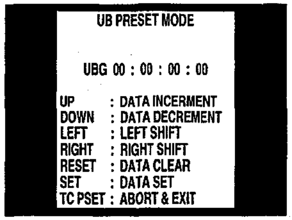


TC PRESET MODE

TCG 00 : 00 : 00 : 00

UP : DATA INCERMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
TC PSET : ABORT & EXIT

Time code presetting



UB PRESET MODE

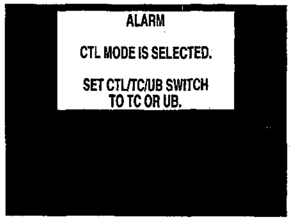
UBG 00 : 00 : 00 : 00

UP : DATA INCERMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
TC PSET : ABORT & EXIT

User's bit presetting

Note

If you press the TC PRESET button while CTL value is displayed, the following alarm messages appear on the monitor screen and the time counter display.



ALARM

CTL MODE IS SELECTED.

SET CTL/TC/UB SWITCH
TO TC OR UB.

CTL mode!

Set the CTL/LTC/U-BIT switch to LTC or U-BIT.

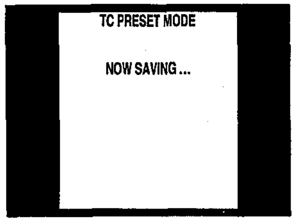
3 Use the ⇦ and ⇨ buttons to select the digit in the value which is flashing.

4 Use the ⇩ and ⇧ buttons to adjust the value of the flashing digit.
Note that user's bit data values are in hexadecimal (digits 0-9 and A-F).

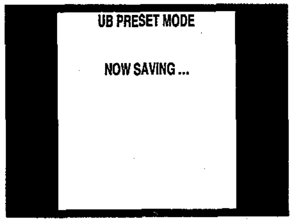
5 Repeat steps **3** and **4** as required to set the required value.
To set the value to 00:00:00:00, press the RESET (NO) button.

6 Press the SET (YES) button.

Either of the two displays shown immediately below appears on the monitor screen and the third display shown below in the time counter display.



Monitor screen



Monitor screen

Time counter display

Once the setting is saved, the monitor screen and time counter display return to normal.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- LTC and users bits cannot be set while the unit is in REC PAUSE mode. Exit the REC PAUSE mode before making these settings.

Internal time code generator running modes

There are two different modes of operation for the internal time code generator, selected by the RUN MODE setting as follows.

"FREE RUN": The time code generator begins to run from the instant the preset value is saved.

"REC RUN": The time code generator runs only during recording.

Presetting the time data value to reflect real time

In the menu, set RUN MODE to "FREE RUN", and set the time data value to the current time.

Chapter 7
Menus

This chapter describes the organization of the principal set-up menus (selecting the superimposed information on the monitor screen, time code, run mode, etc.) and how to use them.

Menu Organization .... **7-2 (E)**
  Hierarchical Structure .... 7-2 (E)
  Menu Screens .... 7-3 (E)
Menu Operations .... **7-9 (E)**
  Buttons Used to Change the Setting .... 7-9 (E)
  Operation Sequence .... 7-10 (E)

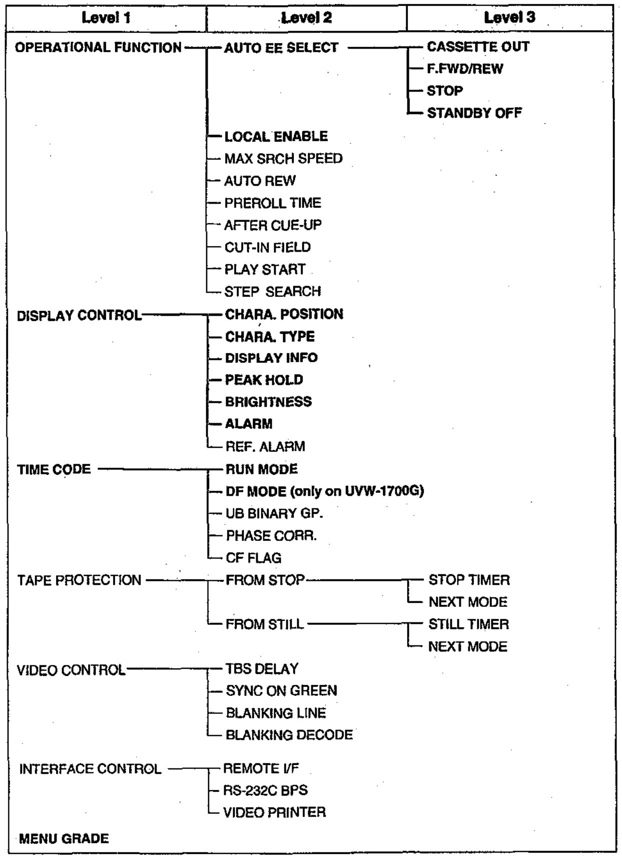
Menu Organization

Hierarchical Structure

The menu screens are arranged in a three-level tree structure, as shown in the figure below. The top-level selections (level 1) access the main divisions of the settings, and except for the MENU GRADE item, the settings themselves are made on levels 2 and 3. The screens are divided into two groups: the basic settings, to which frequent access is normally required, and extended settings, which are less frequently used.

In the following figure, bold lines indicate the basic menu screens, and thin lines the extended menu screens.

Menu organization



Level 1
Level 2
Level 3
OPERATIONAL FUNCTION
AUTO EE SELECT
CASSETTE OUT
F.FWD/REW
STOP
STANDBY OFF
LOCAL ENABLE
MAX SRCH SPEED
AUTO REW
PREROLL TIME
AFTER CUE-UP
CUT-IN FIELD
PLAY START
STEP SEARCH
DISPLAY CONTROL
CHARA. POSITION
CHARA. TYPE
DISPLAY INFO
PEAK HOLD
BRIGHTNESS
ALARM
REF. ALARM
TIME CODE
RUN MODE
DF MODE (only on UVW-1700G)
UB BINARY GP.
PHASE CORR.
CF FLAG
TAPE PROTECTION
FROM STOP
STOP TIMER
NEXT MODE
FROM STILL
STILL TIMER
NEXT MODE
VIDEO CONTROL
TBS DELAY
SYNC ON GREEN
BLANKING LINE
BLANKING DECODE
INTERFACE CONTROL
REMOTE I/F
RS-232C BPS
VIDEO PRINTER
MENU GRADE

Menu Screens

The table below lists the menu screens and explains the meaning of each setting.

In the table the following conventions are used:

- Factory default settings are preceded by an asterisk (*).
- Each indication appears twice: the upper version is what appears on the monitor screen, and the lower version in parentheses appears on the time counter display.
- The time counter display indications are preceded by a number of angle brackets: '>' indicates an item in a level 2 menu, and '>>' and '>>>' indicate an item or a parameter in a lower level menu.

Menu selections

OPERATIONAL FUNCTION: Operation settings (Operational)		**Description of settings**
AUTO EE SELECT **(> Auto EE)** Determine whether the unit enters EE mode or PB mode when audio and video signals from other equipment are input. When this unit is used as the recorder for cut editing, it is possible to output the input audio and video signals to the monitor. The term "EE" mode is used to refer to this feature, which enables the entire editing operation to be carried out with a single monitor.	**CASSETTE OUT** **(>> Cass. out)** When the cassette has been ejected	* EE (>>> EE): Output audio and video signal input from other equipment PB (>>> PB): Mute audio and video signal input
	F. FWD/REW **(>> F. FWD/REW)** Operations when in fast forward or rewind mode Note Set this item to PB when you want to use the F FWD and REW buttons to view playback at 16 times normal speed. If this item is set to EE, holding down the F FWD and REW buttons produces EE pictures.	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Mute audio and video signal input
	STOP **(>> STOP)** Operations when in stop mode	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Output audio and video signal recorded on a tape
	STANDBY OFF **(>> STBY OFF)** Operations when in standby off mode	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Mute audio and video signal input
LOCAL ENABLE **(> Local ENA)** Select which of the tape transport control buttons (EJECT, REW, PLAY, F FWD, STOP and REC) operate when the REMOTE/LOCAL switch is set to REMOTE.		ALL DISABLE (>> ALL DIS): All of the tape transport control buttons are disabled. * STOP & EJECT (>> STOP&EJ): Only the STOP and EJECT buttons are enabled. ALL ENABLE (>> ALL ENA): All of the tape transport control buttons are enabled, and settings such as preroll time change or time data display selection are effective.
MAX SRCH SPEED (> Max SRCH) Maximum search speed		x35 (>> x35) (for UVW-1700G) or x42 (>> x42) (for UVW-1700GP): Allow searching at up to the maximum tape transport speed of 35 or 42 times normal. The picture cannot be seen on the monitor at this speed. * x16 (>> x16): Restrict the search speed to the maximum 16 times normal for which the picture can be seen on the monitor. Use this setting when using search mode for cuing.

(Continued)

Menu Organization

Menu selections (continued)

OPERATIONAL FUNCTION: Operation settings (Operational)	**Description of settings**
AUTO REW (> Auto REW) Whether to rewind automatically when playback reaches the end of a tape	* ENABLE (>> ENABLE): Rewind automatically. DISABLE (>> DISABLE): Do not rewind automatically.
PREROLL TIME (> Preroll)	Set the preroll time in seconds, from 0 to 15. If a PVE-500 or other editing control unit is connected, this setting is ignored, and the editing control unit setting takes precedence. 0 SEC (>> 0 sec) – * 5 SEC (>> 5 sec) –15 SEC (>> 15 sec)
AFTER CUE-UP (> After CUE) Operating mode after cue-up	* STOP (>> STOP): Stop mode STILL (>> STILL): Search mode still
CUT-IN FIELD (> CUT-IN FIELD) Field timing for beginning editing	* 1ST FIELD (>> 1 FLD): Begin editing on the 1st field and end on the 2nd field. 2ND FIELD (>> 2 FLD): Begin editing on the 2nd field and end on the 1st field. 1ST/2ND FIELD (>> 1/2 FLD): Use the timing command sent from the editing control unit.
PLAY START (> PLAY start) Timing for switching to playback mode from stop. In an editing system including an editor such as a PVE-500 editing control unit, adjusting this setting so that the delay before switching to playback mode is the same on all the decks of the editing system means that there is no longer a need to synchronize the decks for editing, and the preroll time can be shortened.	16 FRAME DELAY (>> 16 delay) – 4 FRAME DELAY (>> 4 delay): The larger the numerical value, the longer the delay. By adjusting this setting, it is possible to reduce the phase synchronization time and preroll time during editing. UVW-1700G: * 5 FRAME DELAY (>> 5 delay) UVW-1700GP: * 4 FRAME DELAY (>> 4 delay)
STEP SEARCH (> Step SRCH) Determine whether or not the tape is transported in units of fields during jog/shuttle playback.	* OFF (>> OFF): Transport the tape regardless of fields. in a still picture in jog/shuttle mode or when normal playback is paused, guard bands (noise bars) appear at any location in the picture. ON (>> ON): Transport the tape in units of fields. in a still picture in jog/shuttle mode or when normal playback is paused, guard bands (noise bars) appear at the top and bottom of the picture.

DISPLAY CONTROL: Settings related to indications (Display) on the monitor and the unit	**Description of settings**
CHARA. POSITION **(> Chara pos)** Position of text superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor Note If time code values which appear superimposed on the monitor screen are to be recorded on another VTR, position them in the lower two-thirds of the screen. Time code values displayed in the top one-third of the monitor screen may appear to be delayed by one frame.	Default is bottom center of screen. Use the arrow direction keys to adjust the indication position while watching the monitor. Press the MENU button to confirm the setting and return to the level 1 menu.
CHARA. TYPE **(> Chara type)** Type of characters in text superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor	* WHITE (WITH BKGD) (>> White): White characters on black background BLACK (WITH BKGD) (>> Black): Black characters on white background WHITE (OUTLINE) (>> W/outline): White characters with black outline BLACK (OUTLINE) (>> B/outline): Black characters with white outline Press the MENU button to confirm the setting and return to the level 1 menu.

Menu selections (continued)

DISPLAY CONTROL: (Display) **Settings related to indications on the monitor and the unit**	**Description of settings**
DISPLAY INFO **(> DISP info)** Information superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor **Note** When the TIME DATA & UB or TIME DATA & CTL setting is selected, the lower time data may appear to be delayed by one frame from the upper value.	*TIME DATA & STATUS (>> Time & STA): Time data and operating status TIME DATA & UB (>> Time & UB): Time data selected using the CTL/LTC/U-BIT switch and user's bit value (when user's bit is selected with the CTL/LTC/U-BIT switch, user's bit and LTC value) TIME DATA & CTL (>> Time & CTL): Time data selected using the CTL/LTC/U-BIT switch and CTL value (when CTL is selected with the CTL/LTC/U-BIT switch, CTL and user's bit value) TIME DATA (>> Time): Time data only
PEAK HOLD **(> Peak hold)** Peak hold time for audio level meters	Set the time from zero (OFF) to 1.5 seconds in steps of 0.1 second. 1.5 SEC (>> 1.5 sec) – * OFF (>> OFF)
BRIGHTNESS **(> Brightness)** Brightness of front panel indicators	Set brightness as a percentage of the maximum. * 100% (>> 100%) 66% (>> 66%) 33% (>> 33%)
ALARM **(> ALARM)** Determine whether alarms are issued or not.	* ON (>> ON): Alarms are issued. OFF (>> OFF): Alarms are not issued.
REF. ALARM (> REF ALARM) Determine whether alarms related to reference video signal are issued or not.	ON (>> ON): Alarms are issued. * ON (LIMITED) (>> ON (Limit)): Alarms are issued in recording and EE mode. OFF (>> OFF): Alarms are not issued.

TIME CODE: (Time code) **Settings related to the time code generator**	**Description of settings**
RUN MODE **(> RUN mode)** Run mode of the time code generator.	* FREE RUN (>> FREE RUN): Time code generator keeps running. REC RUN (>> REC RUN): Time code generator only runs while recording.
DF MODE (only on UVW-1700G) **(> DF mode)** Select whether the time code generator and CTL counter operate in drop-frame or non-drop-frame mode. Normally select drop-frame mode, to keep in sync with real time. The non-drop-frame mode is useful for example when using computer graphics, and working on a frame count basis.	* ON (DF) (>> ON DF): Drop-frame mode OFF (NDF) (>> OFF NDF): Non-drop-frame mode
UB BINARY GP. (> Binary Gp.) (for UVW-1700G) Select the user's bit binary group flag of the time code generator.	* 000 (>> 000): Character set not specified 001 (>> 001): 8-bit characters conforming to ISO646 and ISO2022 010 (>> 010): Undefined 011 (>> 011): Undefined 100 (>> 100): Multi-cassette 101 (>> 101): Multiplex 110 (>> 110): Alternate 111 (>> 111): Undefined
UB BINARY GP. (> Binary Gp.) (for UVW-1700GP)	* 00 (>> 00): Not specified 01 (>> 01): ISO character 10 (>> 10): Unassigned-1 11 (>> 11): Unassigned-2

(Continued)

Menu selections (continued)

TIME CODE: (Time code) **Settings related to the time code generator**	**Description of settings**
PHASE CORR. (> Phase corr) Time code generator phase correction	* OFF (>> OFF): Phase is not corrected. ON (>> ON): Phase is corrected.
CF FLAG (> CF flag) Set color framing flag on or off in a unused bit of time code data **Note** This setting relates only to the control of the CF flag bit in the internal time code generator of this unit. It has no effect on normal color framing.	* OFF (>> OFF): Set color framing flag off. ON (>> ON): Set color framing flag on.

TAPE PROTECTION: (Tape protct) **Settings related to tape protection**		**Description of settings**
FROM STOP (> From STOP) Protected mode and time to switch from stop mode for protection of the tape and head drum	STOP TIMER (>> STP Timer) Time to switch to protected mode from stop mode	Select time from 15 settings from 0.5 seconds to 30 minutes. 30 MIN (>>> 30 min) – * 8 MIN (>>> 8 min) – 0.5 SEC (>>> 0.5 sec)
	NEXT MODE (>> Next mode) Tape protection mode when time set in STOP TIMER setting elapses **Note** When this unit is in tension release mode, the drum is still rotating, so the picture can be monitored. In tension release mode, though the unit is also in "standby on" mode (i.e. is on standby), so if the distinction between "standby on" and "standby off" is important (for example when broadcasting), care should be taken over the setting.	* STANDBY OFF (>>> STANDBY): Standby off mode TENSION RELEASE (>>> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.
FROM STILL (> From STILL) Protected mode and time to switch from search mode still or pause for protection of the tape and head drum	STILL TIMER (>> STL timer) Time to switch to protected mode from search mode still or pause	Select time from 15 settings from 0.5 seconds to 30 minutes. 30 MIN (>>> 30 min) – * 8 MIN (>>> 8 min) – 0.5 SEC (>>> 0.5 sec)
	NEXT MODE (>> Next mode) Tape protection mode when time set in STILL TIMER setting elapses **Note** When this unit is in tension release mode, the drum is still rotating, so the picture can be monitored. For both the STEP FWD and TENSION RELEASE settings, the unit is also in "standby on" mode (i.e. is on standby), so if the distinction between "standby on" and "standby off" is important (for example when broadcasting), care should be taken over the setting.	* STEP FWD (>>> Step): The tape is advanced at x$^1/_{30}$ speed for 2 seconds. STANDBY OFF (>>> STANDBY): Standby off mode TENSION RELEASE (>>> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.

Menu selections (continued)

<table>
<tr><th>VIDEO CONTROL: Settings related to video (Video) control</th><th colspan="2">Description of settings</th></tr>
<tr><td>TBS DELAY
(> TBS delay)
Time base stabilizer delay in video EE mode
Note
When used for broadcasting, select VIDEO DELAY.</td><td colspan="2">* SYNC DELAY (>> Sync): The synchronization signal included in the output video signal is delayed from the reference signal by the operating time of the TBS, and output synchronized to the video signal.
VIDEO DELAY (>> Video): The synchronization signal included in the output video signal is synchronized to the reference signal, and only the video signal output is delayed.</td></tr>
<tr><td>SYNC ON GREEN
(> Sync Green)
Select whether or not to add a sync signal to the green signal of the RGB output signal.</td><td colspan="2">* ON (>> ON): Add a sync signal.
OFF (>> OFF): Do not add a sync signal.</td></tr>
<tr><td>BLANKING LINE
(> BLK line)
Determine whether or not to output video signals during blanking. Settings can be made for each of the lines between line 12 and 20 for UVW-1700G, and between line 9 and 23 for UVW-1700GP.</td><td>UVW-1700G:
12 LINE (>> 12 line) –20 LINE (>> 20 line)
UVW-1700GP:
9 LINE (>> 09 line) –23 LINE (>> 23 line)</td><td>* MASK(>>> Mask): Video signal is not output.
HALF(>>> Half): Only a half of video signal (only for line 20 on UVW-1700G, and only for line 23 on UVW-1700GP) is output.
OUTPUT(>>> Output): Video signal is output.</td></tr>
<tr><td>BLANKING DECODE
(> BLK decode)
Determine a method of separating input composite video signals into a luminance signal and chrominance signal during blanking. Settings can be made for each of the lines between line 12 and 19 for UVW-1700G, and between line 9 and 22 for UVW-1700GP.</td><td>UVW-1700G:
12 LINE (>> 12 line) –19 LINE (>> 19 line)
UVW-1700GP:
9 LINE (>> 09line) –22 LINE (>> 22 line)</td><td>* BLACK & WHITE (>>> B&W): Input signals are processed as black and white signals.
BPF(>>> BPF): Input signals are processed with a band-pass filter.</td></tr>
</table>

(Continued)

Menu selections (continued)

INTERFACE CONTROL: Remote interface setting (Interface)	Description of settings
REMOTE I/F (>Remote I/F) Select whether to use the RS-232C or RS-422A interface for the REMOTE connector.	* RS-232C (>>RS-232C): Use the RS-232C interface. RS-422A (>>RS-422A): Use the RS-422A interface.
RS-232C BPS (> RS232C bps) Set the baud rate for communications with equipment connected to the RS232C REMOTE connector on the rear panel.	38400 BPS (>> 38400 bps) 19200 BPS (>> 19200 bps) * 9600 BPS (>> 9600 bps) 4800 BPS (>> 4800 bps) 2400 BPS (>> 2400 bps) 1200 BPS (>> 1200 bps)
VIDEO PRINTER (> Printer) Set the timing for trigger output to a video printer.	16 FIELD DELAY (>> 16 Field): Start trigger output 16 fields before the frame to be output. 15 FIELD DELAY (>> 15 Field): Start trigger output 15 fields before the frame to be output. 14 FIELD DELAY (>> 14 Field): Start trigger output 14 fields before the frame to be output. : * 4 FIELD DELAY (>> 4 Field): Start trigger output 4 fields before the frame to be output. 3 FIELD DELAY (>> 3 Field): Start trigger output 3 fields before the frame to be output. 2 FIELD DELAY (>> 2 Field): Start trigger output 2 fields before the frame to be output. 1 FIELD DELAY (>> 1 Field): Start trigger output 1 field before the frame to be output.

MENU GRADE: Menu screen selection (Menu grade)	Description of settings
—	* BASIC (> Basic): Display basic menu screens. ENHANCED (> Enhanced): Display extended menu screens.

Menu Operations

Although the menu screens are divided into basic and extended categories, the method of operation is the same.

This section describes as an example the procedure required to change the setting for the tape protection mode used when the deck is stopped. Check the location of this setting in the menu tree, by referring to the previous section; it is in the level 2 menu screen "TAPE PROTECTION", which is an extended menu screen.

Buttons Used to Change the Setting

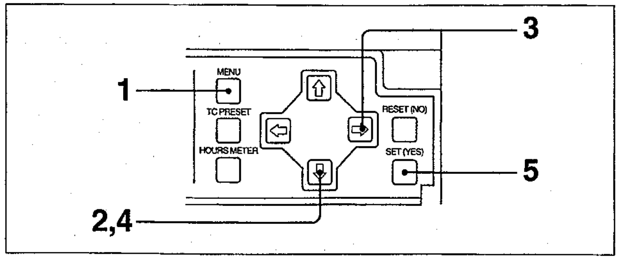
This operation uses the following buttons on the subsidiary control panel.

Buttons used to change the menu setting and their functions

MENU button	• Entering menu mode • Leaving menu mode
⇧ ⇩ buttons	Moving the reverse video cursor up and down to change the selection within a menu screen; if held down, the reverse video cursor continues to move.
⇦ ⇨ buttons	• The ⇦ button moves to the menu at the next higher level. • The ⇨ button moves to the menu at the next lower level. If either button is held down, the reverse video cursor continues to move.
RESET (NO) button	• Returns a setting to its factory default. • Answers 'no' to a question on the monitor screen.
SET (YES) button	• Confirms a changed setting. • Answers 'yes' to a question on the monitor screen.

Operation Sequence

Displaying the extended menus

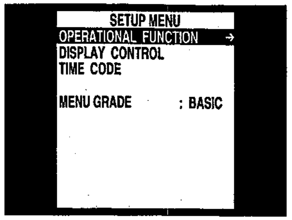


Displaying the extended menus

1 Press the MENU button.

The level 1 menu appears on the monitor screen. The factory default setting is basic menu screens only.
The reverse video cursor shows the current selection; in the figure below, this is "OPERATIONAL FUNCTION." The → mark indicates this item has an associated submenu.
The time counter display shows the selected item only, often in abbreviated form.

Level 1 menu display (basic menu screen)



SETUP MENU
OPERATIONAL FUNCTION →
DISPLAY CONTROL
TIME CODE

MENU GRADE : BASIC

Monitor screen

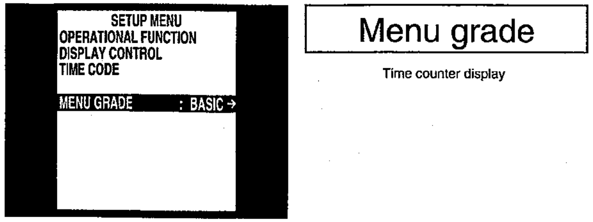
Operational

Time counter display

The "MENU GRADE" setting has no associated submenus. In such a case, the current setting also appears in abbreviated form to the right of the screen. When the factory default setting is currently selected, the ":" indication precedes that setting. In this case the setting does not appear on the time counter display.

2 Press the ⇩ button to select “MENU GRADE :BASIC”.

Selecting MENU GRADE :BASIC


SETUP MENU
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE
MENU GRADE : BASIC →
Menu grade

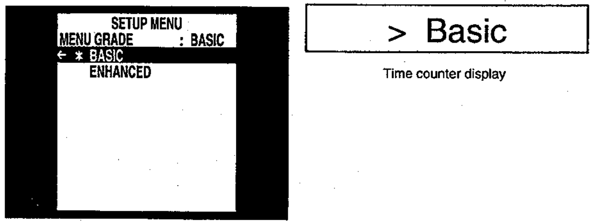
Monitor screen

Time counter display

3 Press the ⇨ button.

This displays all of the settings, and the current selection appears on the monitor screen in reverse video. The ← mark indicates the “BASIC” has an assoicated menu at the next higher level. The “*” indication precedes the factory default setting.

Displaying the settings

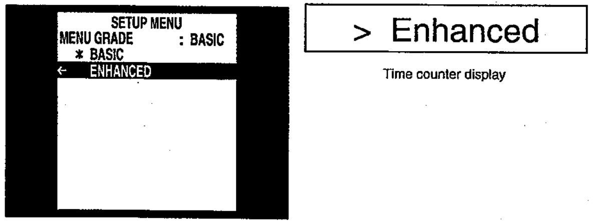

SETUP MENU
MENU GRADE : BASIC
← * BASIC
ENHANCED
> Basic

Monitor screen

Time counter display

4 Press the ⇩ button to select “ENHANCED”.

Selecting ENHANCED


SETUP MENU
MENU GRADE : BASIC
* BASIC
← ENHANCED
> Enhanced

Monitor screen

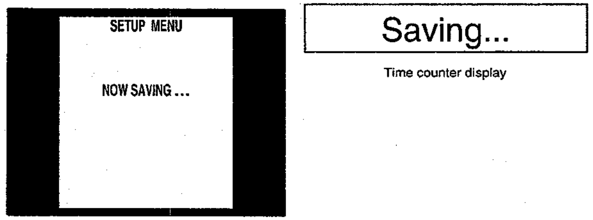
Time counter display

(Continued)

5 Press the SET (YES) button.

The messages shown below appear in the monitor screen and the time counter display, and the new setting is saved in memory.

Messages when saving settings


SETUP MENU
NOW SAVING . . .
Saving...

Monitor screen

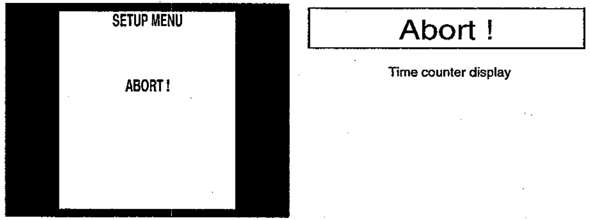
Time counter display

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) button after finishing all the desired settings.

Forcibly aborting the menus

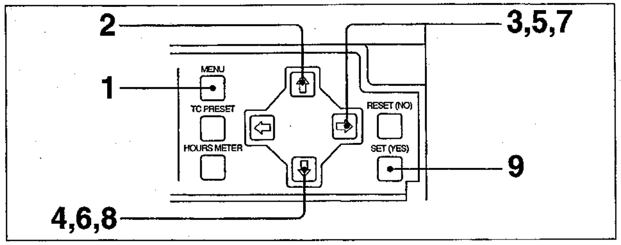

SETUP MENU
ABORT !
Abort !

Monitor screen

Time counter display

Menu Operations

Changing the “NEXT MODE” setting


2
3,5,7
1
MENU
TC PRESET
HOURS METER
RESET (NO)
SET (YES)
9
4,6,8

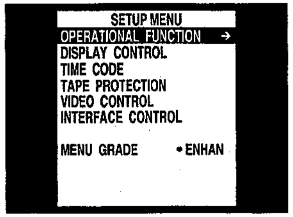
Changing the NEXT MODE setting

1 Press the MENU button.

The level 1 extended menu appears on the monitor screen.

When the currently selected setting is not the factory default setting, the “•” indication instead of the “:” indication precedes that setting.

Level 1 menu display (extended menu screen)


SETUP MENU
OPERATIONAL FUNCTION →
DISPLAY CONTROL
TIME CODE
TAPE PROTECTION
VIDEO CONTROL
INTERFACE CONTROL
MENU GRADE •ENHAN

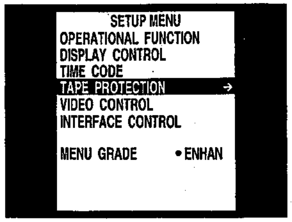
Monitor screen

Operational

Time counter display

2 Press the ⇩ button to select “TAPE PROTECTION”.

Selecting TAPE PROTECTION


SETUP MENU
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE
TAPE PROTECTION →
VIDEO CONTROL
INTERFACE CONTROL
MENU GRADE •ENHAN

Monitor screen

Tape protct

Time counter display

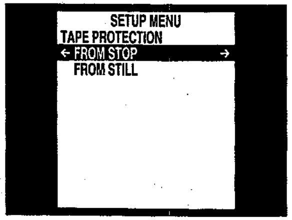
(Continued)

3 Press the ⇨ button.

The level 2 menu screen appears.

When this menu appears for the first time, “FROM STOP” is selected.

Level 2 menu screen (TAPE PROTECTION)


SETUP MENU
TAPE PROTECTION
← FROM STOP →
FROM STILL

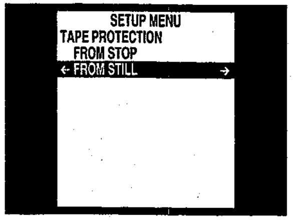
Monitor screen

> From STOP

Time counter display

4 Press the ⇩ button to select “FROM STILL”.

Selecting FROM STILL


SETUP MENU
TAPE PROTECTION
FROM STOP
← FROM STILL →

Monitor screen

> From STILL

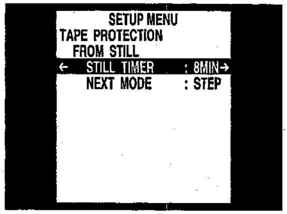
Time counter display

5 Press the ⇨ button.

The level 3 menu screen appears.

When this menu appears for the first time, “STILL TIMER” is selected.

Level 3 menu screen (FROM STILL)


SETUP MENU
TAPE PROTECTION
FROM STILL
← STILL TIMER : 8MIN→
NEXT MODE : STEP

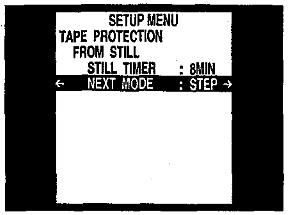
Monitor screen

>> STL timer

Time counter display

6 Press the ↓ button to select “NEXT MODE”.

Selecting NEXT MODE



```
        SETUP MENU
TAPE  PROTECTION
  FROM  STILL
    STILL  TIMER     : 8MIN
←   NEXT  MODE       : STEP →
```

Monitor screen

>> Next mode

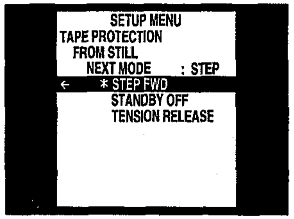
Time counter display

7 Press the → button.

The settings for “NEXT MODE” appear.

When this menu screen appears for the first time, “STEP FWD” is selected.

Setting screen display



```
        SETUP MENU
TAPE PROTECTION
  FROM STILL
    NEXT MODE      : STEP
←       * STEP FWD
          STANDBY OFF
          TENSION RELEASE
```

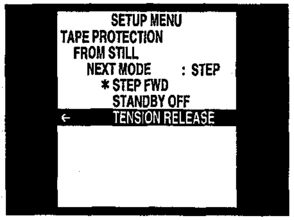
Monitor screen

>>> Step

Time counter display

8 Press the ↓ button to select “TENSION RELEASE”.

Selecting TENSION RELEASE



```
        SETUP MENU
TAPE PROTECTION
  FROM STILL
    NEXT MODE      : STEP
        * STEP FWD
          STANDBY OFF
←         TENSION RELEASE
```

Monitor screen

>>> T.RLSE

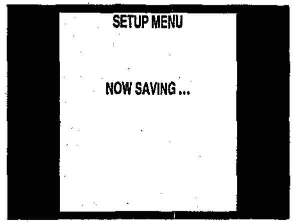
Time counter display

(Continued)

9 Press the SET (YES) button.

The “Saving” message appears on the monitor (as shown below), and the new setting is saved in memory.

Messages when saving settings



```
  SETUP MENU


  NOW SAVING ...
```

Monitor screen

Saving...

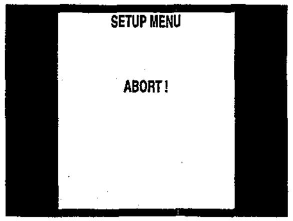
Time counter display

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) button before moving to the next item.

Forcibly aborting the menus



```
  SETUP MENU


    ABORT !
```

Monitor screen

Abort !

Time counter display

Returning menu settings to the factory default

Returning a specific menu setting to its factory default

In the screen for making the setting, press the RESET (NO) button.

In the example above of the "NEXT MODE" setting, press the RESET (NO) button in step **8** to return to the factory default of "STANDBY OFF".

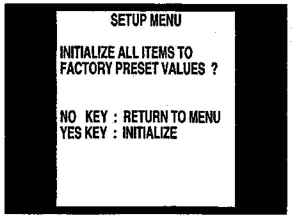
Returning all menu settings to the factory default

1 Press the MENU button to display the level 1 menu.

2 Press the RESET (NO) button.

The following message appears on the monitor screen, which is intended to ask the user to confirm the reinitialization.

Request for confirmation of reinitialization

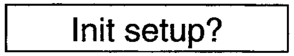


SETUP MENU

INITIALIZE ALL ITEMS TO
FACTORY PRESET VALUES ?

NO KEY : RETURN TO MENU
YES KEY : INITIALIZE

Monitor screen



Init setup?

Time counter display

3 Press the SET (YES) button.

This returns all menu settings to their factory defaults. The "Saving" message appears on the monitor, and the new setting is saved in memory.

Notes

- If you power off this unit while it is in the process of saving the settings, the reinitialization can not be ensured. Wait until saving is completed before powering the unit off.
- If instead of pressing the SET (YES) button, you press the RESET (NO) button, the reinitialization is not carried out, and the display returns to the level 1 menu screen.

Chapter 8
Maintenance

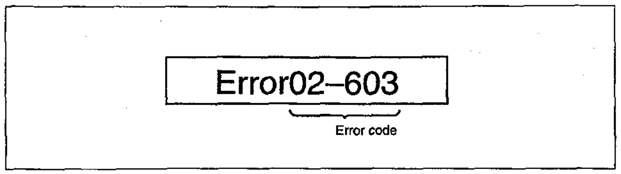
This chapter describes the self-diagnosis function with which this unit is provided, the action to be taken in the event of condensation on the head drum, the digital hours meter, and the head-cleaning process needed to ensure high video and audio reproduction quality.

Self-Diagnostics .... 8-2 (E)
Condensation .... 8-3 (E)
Regular Checks .... 8-4 (E)
  Digital Hours Meter .... 8-4 (E)
  Head Cleaning .... 8-5 (E)

Self-Diagnostics

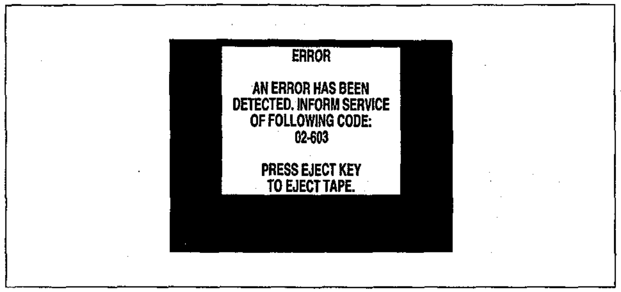
This unit is provided with a self-diagnosis function which detects internal faults. If a fault is detected, this unit displays an error code in the time counter display and an error message on the monitor screen.

To display error messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the subsidiary control panel must be in the ON position.



Error02–603

Example error code displayed on the time counter display



ERROR

AN ERROR HAS BEEN
DETECTED. INFORM SERVICE
OF FOLLOWING CODE:
02-603

PRESS EJECT KEY
TO EJECT TAPE.

Monitor screen error message

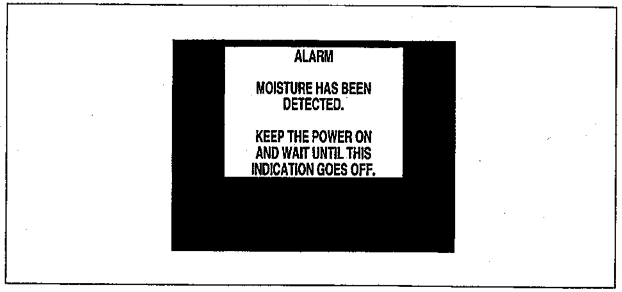
When an error message appears on the monitor screen, follow the direction displayed.

Condensation

If the unit is suddenly moved from a cold to a warm location, or used in a very humid place, moisture from the air can condense on the head-drum. If the tape is run in this state, the tape may stick to the drum, in which case **it is highly likely to be damaged.** To lessen the risk of this occurring, this unit is fitted with a condensation detection system.

If moisture condenses on the head-drum while the unit is operating

The indication "HUMID !" appears in the time counter display. The following indication also appears on the monitor.



ALARM

MOISTURE HAS BEEN DETECTED.

KEEP THE POWER ON AND WAIT UNTIL THIS INDICATION GOES OFF.

Condensation warning indication

If this happens, the cassette is ejected automatically.
Before resuming the operation, wait until the alarm message disappears, without turning the unit off.

If the condensation warning appears immediately after powering on

Leave the unit powered on and wait until the indication disappears. While the indication is present, it is not possible to insert a cassette.
Once the warning indication disappears, the unit is ready for use.

Regular Checks

Digital Hours Meter

The digital hours meter keeps a cumulative count of the total operating time, the drum rotation time, the tape transport operating time, and the number of threading and unthreading operations. These counts can be displayed on the monitor and time counter display; use them as guidelines for scheduling maintenance. Consult your Sony service representative about necessary periodic maintenance checks.

Digital hours meter indications

The digital hours meter provides the following four display items.

T1: OPERATION
Cumulative total of hours unit is powered on, **in units of 10 hours**

T2: DRUM ROTATION
Cumulative total of hours of drum rotation with tape threaded, **in units of 10 hours**

T3: TAPE RUNNING
Cumulative total of hours of tape transport operation, **in units of 10 hours**

CT: THREADING
Cumulative number of tape threading/unthreading operation pairs, **in units of 10 operation pairs**

Except for the total operation time, there are two counts for each item: the cumulative total from manufacture, and a 'trip' count resettable.

Displaying the digital hours meter

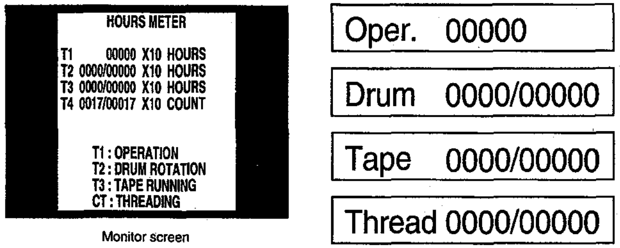
Press the HOURS METER button.

Monitor display
All four counts appear.
The four-digit value to the left of the slash is the resettable trip count, and the right value is the cumulative total from manufacture.

Time counter display

One of the four indications appears. Use the ⇧ and ⇩ buttons to change the item displayed.

Initially, only the trip value appears. Press the ⇥ button to display the cumulative total to the right of the slash, as long as the button is held down.



Digital hours meter

```
HOURS METER

T1     00000 X10 HOURS
T2 0000/00000 X10 HOURS
T3 0000/00000 X10 HOURS
T4 0017/00017 X10 COUNT

T1 : OPERATION
T2 : DRUM ROTATION
T3 : TAPE RUNNING
CT : THREADING
```

Monitor screen

```
Oper.  00000
Drum   0000/00000
Tape   0000/00000
Thread 0000/00000
```

Time counter display

Ending the digital hours meter display

Press the HOURS METER button.

Resetting the trip values

Consult your Sony service representative.

Head Cleaning

Clean both the video and audio heads using the special BCT-5CLN cleaning cassette. Follow the instructions for the cleaning cassette carefully, as improper use can damage the heads.

Cleaning procedure

Insert the cleaning cassette, hold down the PLAY button and press the EJECT button. This carries out a five-second cleaning operation. The EJECT indicator flashes during this period, and all tape transport buttons other than the EJECT button are disabled.

Notes

- Up to three consecutive five-second cleaning operations are possible. Cleaning above this level may damage the heads.
- Be sure the unit is not left with the cleaning cassette in place, as this can cause damage to the heads.

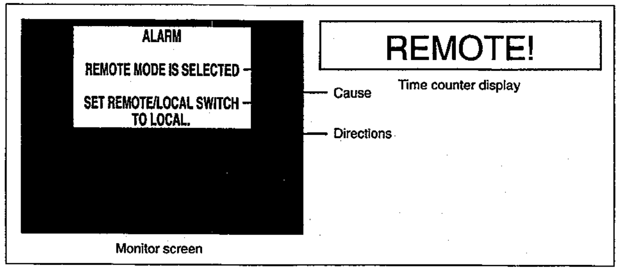
Chapter 9
Operational Problems

If an alarm message appears on the screen, or the unit appears to be malfunctioning, check this chapter before consulting your Sony service representative.

Alarm Messages ....9-2 (E)
Troubleshooting Guide...9-4 (E)

Alarm Messages

There are a number of messages which may appear on the monitor screen during operation. (A message also appears in the time counter display.)


ALARM
REMOTE MODE IS SELECTED
SET REMOTE/LOCAL SWITCH TO LOCAL.
REMOTE!
Cause
Directions
Time counter display
Monitor screen

Alarm messages

These alarm messages indicate misoperations or problems with the unit such as condensation on the drum.

To display these messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the subsidiary control panel must be in the ON position. It is possible to disable the display of warning indications in the menu system, by setting the ALARM and REF. ALARM items to OFF.

For details of the menu settings see the section "Menu Operations" (page 7-9(E)).

If an alarm message is indicated, take appropriate action according to its contents.

The alarm messages indications are listed below.

Alarm messages

Alarm messages on the monitor screen		Alarm messages in the time counter display
Cause	**Direction**	
ABNORMAL SETTINGS SELECTED IN SETUP MENU.	SET ITEMS IN THE SETUP MENU TO THE APPROPRIATE VALUES. CONTACT YOUR DEALER IF THIS ALARM APPEARS AGAIN DESPITE THE ABOVE PROCEDURE.	Irr. SETUP !
MOISTURE HAS BEEN DETECTED.	KEEP THE POWER ON AND WAIT UNTIL THIS INDICATION GOES OFF.	HUMID !
REMOTE MODE IS SELECTED.	SET REMOTE/LOCAL SWITCH TO LOCAL.	REMOTE !
KEY IS JAMMED. CHECK THE FOLLOWING KEYS: (EJECT) (STOP) (F. FWD) (REW) (PLAY) (REC) (UP) (DOWN) (RIGHT) (LEFT) (SET) (H. M.) (TC SET) (MENU) (RESET)		Key short !
NO CASSETTE IN VTR.	—	No Casse !
RECORD INHIBIT PLUG ON THE CASSETTE IS SET TO INHIBIT.	—	REC INH.!
CTL MODE IS SELECTED.	SET CTL/TC/UB SWITCH TO TC OR UB.	CTL mode !
REC-PAUSE MODE IS SELECTED.	TC/UB PRESET IS IMPOSSIBLE IN REC-PAUSE MODE.	REC-PAUSE !
REF VIDEO IS NOT DETECTED.	INPUT A REF VIDEO SIGNAL.	No REF !
A BLACK/WHITE SIGNAL IS BEING USED FOR REF VIDEO.	SUPPLY A COLOR SIGNAL WHEN USING THE COMPOSITE OUT OR S-VIDEO OUT.	B&W REF !
A NON-STANDARD SIGNAL IS BEING USED FOR REF VIDEO.	USE A STANDARD SIGNAL.	REF NON-STD
INPUT VIDEO IS NOT DETECTED.	CHECK THE VIDEO IN SWITCH AND SUPPLY A VIDEO SIGNAL TO VIDEO INPUT.	No INPUT !
TCG REGEN MODE IS SELECTED.	TC/UB CANNOT BE PRESET IN AUTO MODE.	REGEN mode!
VIDEO PRINTER IS NOT CONNECTED.	—	No Printer !

Troubleshooting Guide

Tape problems		
Symptom	**Cause**	**Remedy**
Recording is not possible.	The record-inhibit plug on the cassette is pressed in [a].	Pull out the plug, or use a different tape.
The tape transport controls (PLAY, F FWD, REW buttons etc.) do not operate.	The REMOTE/LOCAL switch is in the REMOTE position, and the LOCAL ENABLE menu setting is "STOP & EJECT" or "ALL DISABLE" [a].	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL ENABLE".
	No cassette is loaded [a].	Insert a cassette.
Pressing the PLAY button does not enter playback mode.	The unit is in REPEAT mode.	Set the REPEAT MODE menu item to OFF. When REPEAT MODE is set to ON, pressing the PLAY button cues up the repeat start point instead of entering playback mode.

Audio problems		
Symptom	**Cause**	**Remedy**
It is not possible to disable the Dolby noise reduction.	—	On this unit, it is not possible to disable the Dolby noise reduction.

Time code problems		
Symptom	**Cause**	**Remedy**
It is not possible to preset the time counter display to an arbitrary value.	The CTL/LTC/U-BIT switch is in the CTL position.	Set the CTL/LTC/U-BIT switch to the LTC or U-BIT position. (It is not possible to preset time counter values.)
	The REMOTE/LOCAL switch is in the REMOTE position, and the LOCAL ENABLE menu setting is "STOP & EJECT" or "ALL DISABLE" [a].	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL ENABLE".
Although the tape transport is operating, the time counter value does not change.	The MENU button, TC PRESET button or HOURS METER button has been pressed.	Press the button again, to exit from menu setting mode, time code presetting mode or hours meter mode, as the case may be. (In either of these modes, the time counter display does not show time counter information.)
	The time counter display is showing user's bit data.	Set the CTL/LTC/U-BIT switch to the LTC or CTL position.

a) In these states an alarm message appears both on the monitor screen and time counter display.

Monitor problems

Symptom	Cause	Remedy
A "V" [a]appears on the screen.	The TBS DELAY menu item is set to "VIDEO DELAY".	Set TBS DELAY to "SYNC DELAY". (The UVW-series has a built-in time base stabilizer. Therefore, in recording mode or video EE mode, the output video signal is delayed exactly 8 lines behind the reference signal. This means that when the TBS DELAY setting is "VIDEO DELAY", the video appears 8 lines lower on the monitor, and a "V" appears. However, even if the TBS DELAY item is set to "SYNC DELAY", if the monitor is synchronized to an external reference, a "V" also appears. This is not a malfunction.)
	A reference video signal is not being input. Alternatively, the input video signal is not synchronized to the reference signal [b].	Input a reference signal which is synchronized to the input video signal. Alternatively, use the REF. VIDEO INPUT connector on this unit in loop-through mode, and connect to the player REF. VIDEO INPUT. (In recording mode, the servo synchronizes to the input video signal. Therefore, if the input video signal and reference video signal are not synchronized, the time base stabilizer and servo will not synchronize, and therefore the picture will break up. Recording in this condition, however, will not affect the quality of the recording.)
The time code (or other time counter indication) superimposed on the monitor is one frame behind.	The time code is being displayed in the top third of the screen.	Move the display position down. (When using a superimposed time code, and recording on another VTR avoid the top third of the screen. In the UVW-series, the time code is superimposed as soon as read, and therefore even discontinuous time information such as user's bit data can be displayed with the minimum of delay. However, since the new data value is still being processed while the beam is scanning the top third of the screen, the data from the previous frame appears if the time code is diaplayed within this area.)
The picture does not appear in video EE mode.	The connector to which the video signal is input does not match the settings of the VIDEO IN selector switches.[b]	Make the settings of the VIDEO IN selector switches match the connector to which the video signal is input.
No superimposed information appears on the monitor screen.	The CHARACTER switch is in the OFF position.	Set the CHARACTER switch to the ON position.
	The monitor is not connected to the VIDEO 2 (SUPER) OUTPUT connector.	Connect the monitor to the VIDEO 2 (SUPER) OUTPUT connector. (To display superimposed information, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector.)
The monitor screen is too bright.	The monitor INPUT connector 75 Ω termination switch is in the OFF position, or there is no terminating device.	Set the monitor INPUT connector 75 Ω termination switch to the ON position, or connect a terminating device.
The monitor screen is too dark.	When using the monitor INPUT connectors of two or more monitors for a loop-through connection, more than one 75 Ω termination switch is set to the ON position.	Set the 75 Ω termination switch of the monitor INPUT connector being used for a loop-through connection to the OFF position.
The video image is too dark when recording a composite video signal.		

a) V-blanking *(see page A-7(E))*
b) In this state an alarm message appears on the monitor screen and time counter display.

Appendixes

Specifications ....A-2 (E)
Glossary ....A-5 (E)

Specifications

General

Power requirements	UVW-1700G: 100 to 120 V AC, 50/60 Hz UVW-1700GP: 200 to 240 V AC, 50/60 Hz
Power consumption	85 W
Operating temperature	+5°C to +40°C (+41°F to +104°F)
Storage temperature	–20°C to +60°C (–4°F to +140°F)
Humidity	Less than 80%
Mass	19 kg (41 lb 12 oz)
External dimensions	427 mm (W) × 193 mm (H) × 474 mm (D) ($16\frac{3}{4}$" × $7\frac{5}{8}$" × $18\frac{5}{8}$"), excluding external projections

Tape transport system

Tape speed	UVW-1700G: 118.6 mm/s UVW-1700GP: 101.5 mm/s
Maximum recording/playback time	UVW-1700G: 90 minutes or longer (for BCT-90MLA) UVW-1700GP: 100 minutes or longer (for BCT-90MLA)
Fast forward/rewind time	180 s or less (for BCT-90MLA)
Recommended cassettes	Betacam SP $\frac{1}{2}$-inch cassette Metal tapes: BCT-5MA/10MA/20MA/30MA, UVWT-10MA/20MA/30MA BCT-5MLA/10MLA/20MLA/30MLA/60MLA/90MLA, UVWT-60MLA/90MLA or equivalent

Video system

Recording method	Luminance: frequency modulation Chrominance: Time division/time compression chrominance frequency modulation

			Metal tape
Bandwidth	Luminance		NTSC: 30 Hz to 4 MHz +1.0 dB/–4.0 dB PAL: 25 Hz to 5 MHz +1.0 dB/–4.0 dB
	Color difference (R–Y/B–Y)		NTSC: 30 Hz to 1.5 MHz +1.0 dB/–4.0 dB PAL: 25 Hz to 1.5 MHz +1.0 dB/–4.0 dB
S/N ratio	Luminance (component IN/OUT)		NTSC: 49 dB or more, PAL: 46 dB or more
	Chrominance	Amplitude modulation	NTSC: 52 dB or more, PAL: 48 dB or more
		Phase modulation	NTSC: 52 dB or more, PAL: 48 dB or more
K factor (2T pulse)			3% or less
Y/C delay			30 ns or less

Audio System

Recording method Bias

Metal tape	
Frequency characteristics	50 Hz to 15 kHz +2.0 dB/–3.0 dB
S/N ratio (at 3% distortion level for NTSC) (Referred to peak level [a]) Weighted CCIR 468-3 for PAL)	NTSC: 70 dB or more PAL: 66 dB or more
Distortion (THD) (at 1 kHz reference level)	1.5% or less
Wow and flutter	0.15% rms or less

a) Peak level= +8 dB above operational level

Input connectors

Video input

REF. VIDEO	BNC × 2 (loop-through connection) Composite video: 1.0 Vp-p ±0.3 V, 75 Ω, sync negative (286 mV for UVW-1700G, 300 mV for UVW-1700GP) Composite sync: 0.2 to 5.0 Vp-p, 75 Ω, negative (when using component signals)
VIDEO	BNC × 2 (loop-through connection) Composite video: 1.0 Vp-p, 75 Ω, sync negative
RGB/COMPONENT	BNC × 3 G plus sync/Y: 1.0 Vp-p, 75 Ω, sync negative or G: 0.7 Vp-p, 75 Ω R/R–Y: 0.7 Vp-p, 75 Ω B/B–Y: 0.7 Vp-p, 75 Ω
S-VIDEO	DIN 4-pin × 1

Audio input

AUDIO CH-1/2	XLR 3-pin × 2 (female) ON: +4 dBu, 600 Ω, balanced OFF: +4 dBu, 10 kΩ, balanced (0 dBu = 0.775 Vrms)

Specifications

Output connectors

Video output

VIDEO 1/2 (SUPER)	BNC × 2 Composite video, 1.0 Vp-p, 75 Ω, sync negative (286 mV for UVW-1700G, 300 mV for UVW-1700GP) Switch selection on the subsidiary control panel controls whether time codes and other superimposed information are output from VIDEO 2 (SUPER) OUTPUT.
RGB/COMPONENT	BNC × 3 G plus sync/Y: 1.0 Vp-p, 75 Ω, sync negative or G: 0.7 Vp-p, 75 Ω R/R–Y: 0.7 Vp-p, 75 Ω B/B–Y: 0.7 Vp-p, 75 Ω
RGB SYNC	BNC × 1 Composite sync (no burst): 2.0 Vp-p, 75 Ω, negative
S-VIDEO	DIN 4-pin × 1

Audio output

AUDIO CH-1/2	XLR 3-pin × 2 (male) +4 dBu (600 Ω load), low impedance, balanced
MONITOR AUDIO	RCA phono jack × 1
HEADPHONES	Stereo phone jack Maximum –14 dBu, 8 Ω (0 dBu = 0.775 Vrms)

Remote connectors

RS232C REMOTE: 25-pin multi × 1
RS422A REMOTE: 9-pin multi × 1
REMOTE OUT: Stereo mini-jack × 1
CONTROL S: Stereo mini-jack × 1

Supplied accessories

AC power cord (1)
Operating Instructions (1)

Optional accessories

RMM-130 Rack Mount Adaptor
BCT-5CLN Cleaning Cassette
SVRM-100/100A Remote Control Unit

Design and specifications are subject to change without notice.

Glossary

A/B roll edit
An edit in which two or more players are used to create special effects such as dissolve and wipe, and one recorder is used to record the results of the edit. Using an editing controller allows efficient control of the VTRs and very precise editing.

B–Y signal
A chrominance signal determined by subtracting the Y (luminance) signal from the B (blue) signal. One of the component signals.

Bridging connection
A connection which allows a signal input to an input terminal to pass through the unit and exit from an output terminal as input to external equipment. Also called loop-through connection.

Capstan
A drive mechanism that moves the tape at a specified speed. Its rotation normally synchronizes with a reference sync signal.

Chrominance signal
Color signal containing color information such as hue and saturation. Also called C signal.

Color frame
The color subcarrier phase, whose one cycle consists of two frames (four fields) in NTSC format and four frames (eight fields) in PAL format.

Color framing
Maintenance of continuity in the color subcarrier phase between one frame and the next, for the purpose of avoiding noise on the picture.

Component video signal
A video signal consisting of a luminance signal (Y) and two chrominance signals (R–Y, B–Y).

Composite video signal
A composite video signal containing video, burst and sync signals.

CTL
Abbreviation of control signal. A pulse signal recorded on a longitudinal track of the tape in units of fields. Counting this signal allows the number of frames to be used to display the tape running time. It is also used as a control signal to adjust the relationship between the scanning position of the video heads and tape movement during playback to match that during recording.

Drop frame mode
In NTSC format, the actual number of frames per second is approximately 29.97, while that for the time code is specified as 30. Drop frame mode is a mode in which the time code is advanced in such a way that the difference in frame value between real time and the time codes is corrected. In this mode, two frames are skipped at the beginning of each minute, except for every tenth minute, so that the frame value for time codes matches that for real time.

EE mode
Abbreviation of Electric to Electric mode. Video and audio signals are supplied to the VTRs internal circuits, but not to the recording heads.

External synchronization
Synchronization of the signals and tape transport of a VTR with those of a reference VTR.

Guard bands
These are unrecorded regions between adjacent tracks on a tape which prevent crosstalk between the signals on the two tracks. In jog/shuttle mode, since the path of the heads crosses the tracks, the guard bands can appear as horizontal bars (noise bars) on the monitor screen. The same problem can occur during normal playback if the tracking of the heads is not adjusted correctly.

IRE
A unit for expressing video level as determined by the Institute of Radio Engineers (now called the Institute of Electrical and Electronic Engineers).

LNG recording
Abbreviation of longitudinal recording. A method of recording audio signals by radio frequency bias method on the longitudinal track of the tape using the fixed head.

LTC
Abbreviation of Longitudinal Time Code. A time code recorded in a separate track at the edge of the tape.

Luminance signal
The signal that determines the brightness of the picture. Also called Y signal. One of the component signals.

Metal tape
Magnetic tape coated with microscopic particles of metal dispersed in a liquid binder. It allows high-density recording.

Moisture condensation
Condensation of moisture on the tape transport mechanisms. If moisture condenses on the head-drum, the tape adheres to the drum and causes malfunction.

Non-drop-frame mode
A mode of advancing the time code in such a way that the difference in frame values between real time and the time code is neglected. Using this mode produces a difference of approximately 86 seconds per day between real time and time code, which causes problems when editing programs in units of seconds using the number of frames as a reference.

Oxide tape
Magnetic tape coated with microscopic particles of ferric oxide dispersed in a liquid binder.

Reference video signal
A video signal consisting of a sync signal or sync and burst signals, used as a reference.

RGB signals
Red, green and blue signals, representing the primary colors. Color television is displayed by mixing red, green and blue components.

R–Y signal
A chrominance signal determined by subtracting the Y (luminance) signal from the R (red) signal. One of the component signals.

SMPTE
Society of Motion Picture and Television Engineers.

S/N ratio
Abbreviation of Signal-to-Noise ratio. The higher the S/N ratio, the less noise and higher the picture quality.

Search mode
A VTR mode used when searching for specific scenes, by viewing the video output or time codes while playing back the tape at various speeds in forward or reverse direction.

Servo lock
Synchronizing the drum rotation phase and tape transport phase with a reference signal during playback and recording so that the video heads scan the tape in the same pattern during playback and recording.

Superimpose
To put a picture (or a set of characters) onto another so that both can be seen at the same time.

S-video input connector
A connector that inputs Y (luminance) and C (chrominance) signals separately to reduce interference between Y and C signals, and to help reproduce noiseless images.

Sync signal
A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning patterns of the video camera and the monitor.

TBC
Abbreviation of Time Base Corrector. Electronic circuits to electrically stabilize the playback signals by removing color variation and roll in the playback picture caused by irregularity in drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signals.
The TBC is designed for user adjustment of sync phase and subcarrier phase with reference to the reference video signal, or user adjustment of signal levels including video and chroma signal level.

TBS
Abbreviation of Time Base Stabilizer. Similar to TBC circuits, although not designed for user adjustment of sync phase and subcarrier phase with reference to the reference video signal, or user adjustment of signal levels including video and chroma signal level.

Time code
Signals recorded on the tape to supply information on tape position such as the hour, minute, second and frame, to assist in setting edit points or searching for particular scenes. There are two types of time code: LTC and VITC.

Tracking
Electrically controlling the video head so that the playback phase matches the recording phase of the tape. Especially when playing back the tape with a VTR other than the one used for recording, adjusting the tracking prevents noise from appearing on the picture.

User's bits
Sections of the time code consisting of a total of 32 bits used for recording information such as the year, month and day, tape ID number or a program ID number.

V-blanking
The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in the cameras and monitors are turned off so that they can return from the bottom of the screen to the top without showing traces of movement on the screen. When the position of V-blanking is not adjusted correctly, a horizontal black bar appears on the screen.

VBS
Abbreviation of Video, Burst and Sync. A composite signal consisting of video signal, burst signal and sync signal.

VITC
Abbreviation of Vertical Interval Time Code.
Time code recorded on a video signal track during V-blanking interval. It can be read correctly even during slow or still picture playback.

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Precautions

To take best advantage of the many features of this unit, note the following important points.

Usable cassette tapes (see page 3-3(E))
Use only metal cassette tapes with this unit. Do not use oxide tapes.

Reference video input (see page 3-5(E))
When recording or playing back videotapes on this unit, always input a composite video signal synchronized with the video signal to be used to the REF. VIDEO INPUT connector. Especially when recording, failure to input a reference video signal to the REF. VIDEO INPUT connector will prevent the built-in time base stabilizer (TBS) from functioning correctly, causing picture breakup. Even if you are recording only audio signal or time code, do not fail to input a reference video signal.

Selecting the input video signal types (see page 4-11(E))
When recording, set the VIDEO IN selector switches on the subsidiary control panel to match the type of video input signal. Note that when inputting component video signals you must set both the upper and lower VIDEO IN selector switches properly. If these switches are not set to the correct positions, pictures will not appear on the monitor and recording is impossible.

Setting the cassette record-inhibit plug (see page 3-4(E))
Recording on a cassette is impossible when its record-inhibit plug is pushed in. If the record-inhibit plug is pushed in on the cassette you are going to use, either use a new tape, or pull out the plug and use the tape after making sure that it contains no important material.

Controlling tape transport remotely (see page 6-4(E))
The tape transport buttons on this unit are normally disabled when the REMOTE indicator is lit. However, you can use these buttons if you set the LOCAL ENABLE menu item to ALL ENABLE. The factory default setting for this item is STOP & EJECT.

Storing in a rack
When installing this unit in a standard 19-inch rack, you can stack up to three units in one rack. When stacking four or more units, be sure to leave space equivalent to one unit height, or 44.45 mm (1 3/4 inches) between units.

Chapter 1
Overview

This chapter overviews the features of this unit.

Features .... 1-2 (E)

Features

The UVW-1400A/1400AP is a Betacam SP videocassette recorder, capable of recording and playing back composite video, component video and analog audio signals.
The UVW-1400A is for the NTSC system, and the UVW-1400AP is for the PAL system. The descriptions and explanations in this manual are common to both the UVW-1400A and UVW-1400AP unless otherwise indicated.

Betacam SP format

Excellent video and audio performance

The Betacam SP format provides superior video and audio performance, with an improved signal-to-noise ratio, better frequency response and improved reproduction of details, for greatly enhanced video and audio quality.

Compatibility with other Betacam SP VTRs

A metal tape cassette recorded on this unit can also be played back on other Betacam SP VTRs[1]. Again metal tape cassettes recorded on other Betacam SP VTRs can be played back on the UVW-1400A/1400AP. The cassette size is detected automatically.

Full range of recording and playback functions

RGB signal recording and playback

Direct input and output of RGB signals is possible. You can either use an RGB signal including a sync signal or input or output an independent sync signal.

Built-in time code generator and reader

The built-in time code generator allows the unit to record time codes (LTC or user's bits) simultaneously with the video and audio signals. The built-in time code reader allows the unit to read time codes (LTC or user's bits) from a tape.

Built-in time base stabilizer (TBS)

The built-in time base stabilizer allows you to obtain a stable playback picture with no horizontal jitter or color fluctuation.

Microprocessor servo system

Four microprocessor-controlled DC motors provide direct drive for the drum, capstan and reels, enabling quick and accurate tape access.

Audio noise reduction

Longitudinal audio tracks 1 and 2 use the same Dolby C-type noise reduction[2] as a conventional Betacam SP System. These circuits are always operating when recording or playing back.

---

[1] Because this unit does not record the AFM carrier wave, noise may be heard when tapes recorded on this unit are played back by other VTRs in the BVW series. If necessary, lower the audio levels of channels 3 and 4 on the other VTR.

[2] Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol ◻◻ are trademarks of Dolby Laboratories Licensing Corporation.

Backspace edit
This unit has a backspace edit function. It allows you to pause and resume recording with no breakup in the picture when controlling this unit from a remote control unit or computer.

Repeat playback
A repeat playback between selected two points is possible.

Foot switch for start and pause control of recording
By connecting a Sony RS-20 or other foot switch to the REMOTE 2 connector on the rear panel, you can start and pause recording by foot control. Three types of foot switch are supported: select the type by a menu operation.

Triggering a video printer
By connecting the REMOTE OUT connector on the rear panel to the REMOTE 2 connector of a Sony UP-5000/7000-series or other video printer, you can automatically output a desired frame on the video printer by pressing the FREEZE button on an SVRM-100/100A remote control unit. Use a menu operation to set the output timing according to the video printer being used.

Other features

Compact, power-saving design
The unit is light and simple, and very energy-efficient.

Menu system
All the initial settings for system operation conditions and so forth are accessed through a simple menu system, from the subsidiary control panel.

Remote control function
The unit can be operated from a computer unit through the RS-232C serial interface.
It is also possible to use the CONTROL S connector on the front panel to connect a simple remote control unit (SIRCS type remote control unit such as an SVRM-100/100A) to carry out search operations.

Digital hours meter
The digital hours meter keeps cumulative totals of four values: the total hours powered on, the drum rotation time, the tape running time, and the numbering of threading/unthreading operations. These are displayed as superimposed text on the video monitor.

Superimposed text output
The VIDEO 2 (SUPER) OUTPUT connector provides a monitor video output which can have various information (time codes, tape speed, system settings, etc.) superimposed on it. The superimpose function can be enabled or disabled as required.

Features

S-video connectors
With VTRs or other peripheral equipment having S-video connectors, these connectors provide a high-grade interface for video signal transfer.

Self-diagnostics
If an operating fault occurs, the system attempts to diagnose the problem, and produces an error code on the time counter display and superimposed video output.

Alarm indications
If a misoperations or faulty connections are made, the system superimposes information on the monitor screen giving nature of the error and actions to be taken. The cause of the problem is also indicated in the time counter display.

Chapter 2
Location of Parts and Controls

This chapter lists the names of all the controls and other components used in the operation of the unit.

Front Panel ....2-2 (E)
Rear Panel ....2-5 (E)

Front Panel

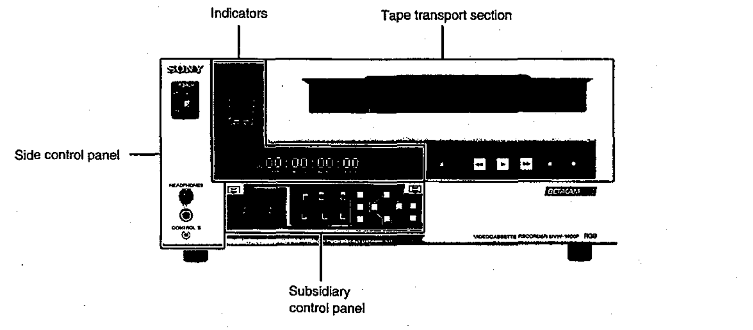
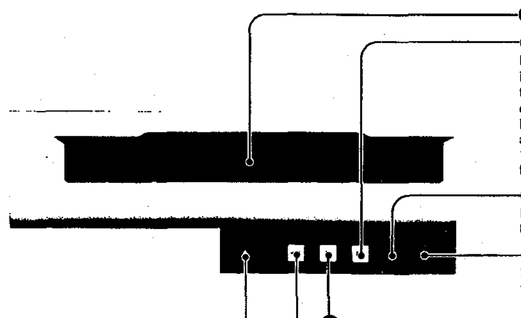


Photo: UVW-1400P

Front Panel

Tape transport section



❶ **Cassette insertion aperture**

❷ **F FWD (fast forward) button**
Pressing this button lights the indicator and fast forwards the tape. In fast forward, the picture does not appear on the monitor. Holding down this button provides a monochrome search function at 16 times normal speed in the forward direction.[a]

❸ **STOP button**
Pressing this button stops the tape transport.

❹ **REC (record) button**
Holding down this button while pressing the PLAY button lights the indicator and starts recording.

❺ **PLAY button**
Pressing this button lights the indicator and starts playback. Pressing the PLAY button during the recording ends the recording mode, and starts playback.

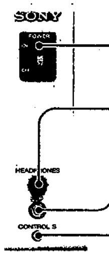
❻ **REW (rewind) button**
Pressing this button lights the indicator and rewinds the tape. During rewind, the picture does not appear on the monitor. Holding down this button provides a monochrome search function at 16 times normal speed in the reverse direction.[a]

❼ **EJECT button**
Pressing this button lights the indicator, and a few seconds later the cassette is ejected.

a) The F.FWD/REW item under the AUTO EE SELECT menu item must be set to PB *(see page 6-4(E))*.

Tape transport section

Side control panel



⑧ **POWER switch**
Pressing this switch on the side marked "ON" powers on the unit. The audio level meters and time counter display light.

⑨ **HEADPHONES level control**
Adjusts the headphone volume.

⑩ **HEADPHONES connector (stereo phone jack)**
Connect headphones (8 Ω) to monitor recording and playback audio on the unit.

⑪ **CONTROL S connector (Stereo mini-jack)**
Connect an optional remote control unit such as the SVRM-100/100A to this connector to allow remote control of the unit.

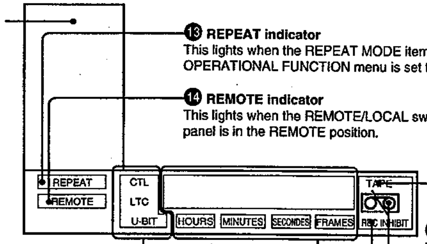
Note

Unless the LOCAL ENABLE menu item is set to ALL ENABLE, the tape transport buttons are disabled whenever the REMOTE indicator is lit.

Side control panel

Indicators

⑫ **Audio level meters**
In recording or EE mode these indicate the recording audio level, while during playback they indicate the playback audio level.



⑬ **REPEAT indicator**
This lights when the REPEAT MODE item in the REPEAT FUNCTION of OPERATIONAL FUNCTION menu is set to ON.

⑭ **REMOTE indicator**
This lights when the REMOTE/LOCAL switch on the subsidiary control panel is in the REMOTE position.

⑮ **Time data indicators**
These indicate the type of time data shown in the time counter display.

⑯ **Time counter display**
This shows a CTL signal count value (hours:minutes:seconds:frames), longitudinal time code (LTC), or user's bit data. In combination with the HOURS METER button on the subsidiary control panel, it is also used to display the hours meter data selected from the menu.

If an error code indication in the form "Errorxx-xxx" appears in the time counter display, consult your Sony service representative.

⑰ **TAPE indicator**
If you insert an oxide tape cassette, this indicator flashes. Press the EJECT button, and remove the cassette.
The UVW-1400AP automatically ejects oxide tapes.

⑱ **Tape end indicator ( )**
When there is only about 2 minutes of tape remaining, this indicator flashes.

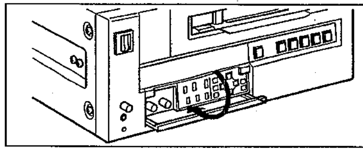
⑲ **REC INHIBIT indicator**
This indicator lights when the cassette loaded has the record inhibit plug set to inhibit recording.

Indicators

Front Panel

Subsidiary control panel

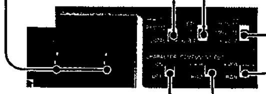
The subsidiary control panel is behind a flap on the front panel. Open the flap as shown in the figure.



Pull the flap forward and down, then push into the panel.

Accessing the subsidiary control panel

Switches and Controls



㉕ **AUDIO INPUT LEVEL controls**
These adjust the audio input levels for each of channels 1 and 2 when recording.

⑳ **REMOTE/LOCAL switch**
Selects whether the unit is controlled remotely from a device connected to the REMOTE connector on the rear panel, or locally from the control panel.

㉑ **CTL/LTC/U-BIT switch**
Selects the type of time data (CTL, LTC or user's bits) displayed.

㉒ **VIDEO IN selector switches**
Select the type of video input signal for recording or playing back a component signal (the Y-R,B or RGB position), a composite signal (COMPOSITE position), or an S-video signal (S-VIDEO position).

㉓ **COMPONENT OUT selection switch**
Selects R/G/B signals or Y/R–Y/B–Y signals for output from the RGB/COMPONENT connectors.

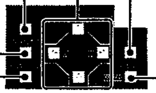
㉔ **CHARACTER switch**
Determines whether or not character information such as time codes is superimposed on the video output signal from the VIDEO 2 (SUPER) OUTPUT connector.

Menu Control, Time Code and Digital Hours Meter Button

㉚ **TC (time code) PRESET button**
Press this button to preset the LTC or user's bit value shown on the time counter display.
For details of how to set time code values, see the section "Setting Longitudinal Time Code and User's Bits" (page 5-3(E)).

㉛ **HOURS METER button**
Pressing this button switches the information superimposed on the monitor screen to show the digital hours meter values. The time counter display also shows the hours meter information at the same time. Pressing the button again returns to the normal indications.
For details of the digital hours meter, see the section "Digital Hours Meter" (page 7-4(E)).

㉖ **MENU button**
Pressing this button displays menu options on the monitor screen and the time counter display. Pressing the button again returns to normal operating mode.
For details of menu operations, see the section "Menu Operations" (page 6-10(E)).



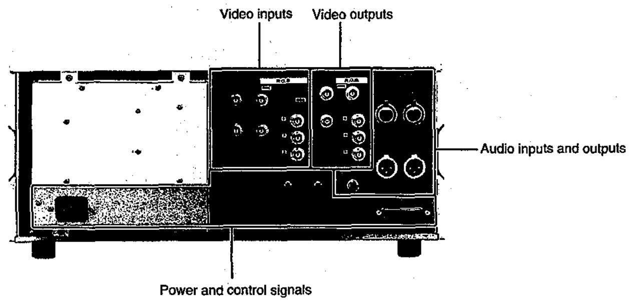
㉗ **Arrow direction**
(↑ ↓ ← (A) → (B)) buttons
Use these buttons to move around the menu settings, for setting time code values and also for setting the repeat A and B points.
For details of how to set time code values, see the section "Setting Longitudinal Time Code and User's Bits" (page 5-3(E)).

㉘ **RESET (NO) button**
This button resets menu settings to their factory defaults, resets a time code value to zero, and is also used for a negative response to a menu question.

㉙ **SET (YES) (MARK) button**
This button confirms new menu or time code settings. It is also used for a positive response to a menu question and for setting the repeat A and B points.

Subsidiary control panel

Rear Panel



Rear Panel

Video inputs

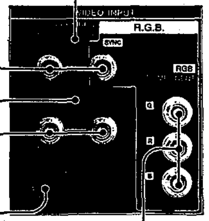
❶ REF. (reference) VIDEO 75 Ω termination switch
Set this switch to the OFF position when using both REF. VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.

❷ REF. (reference) VIDEO INPUT connectors (BNC)
Input a reference video signal or a composite sync signal (not a black burst signal). The two connectors can be used for a loop-through connection.

❸ VIDEO 75 Ω termination switch
Set this switch to the OFF position when using both VIDEO INPUT connectors for a loop-through connection, and to the ON position when not.

❹ VIDEO INPUT connectors (BNC)
Input a composite video signal. The two connectors can be used for a loop-through connection.

❺ S-VIDEO INPUT connector (4-pin)
Input an S-video signal (separated video: luminance and chrominance (UVW-1400A: 3.58 MHz, UVW-1400AP: 4.43 MHz signals).



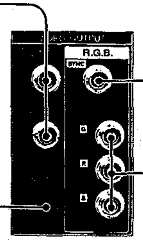
❻ RGB/COMPONENT INPUT connectors (BNC)
Connect separate component video input signals
(RGB or Y, R–Y and B–Y).

Video inputs

Video outputs

❼ VIDEO 1 and 2 (SUPER) OUTPUT connectors (BNC)
Output composite video signals. When the CHARACTER switch on the subsidiary control panel is in the ON position, character information is superimposed on the video signal output from the VIDEO 2 (SUPER) OUTPUT connector.

❽ S-VIDEO OUTPUT connector (4-pin)
Outputs an S-video signal (separated video: luminance and chrominance (UVW-1400A: 3.58 MHz, UVW-1400AP: 4.43 MHz) signals).



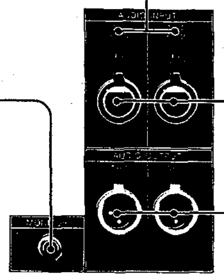
❾ RGB SYNC OUTPUT connector (BNC)
This outputs a composite sync signal (not a black burst signal).

❿ RGB/COMPONENT OUTPUT connectors (BNC)
Output separate component video signals (RGB or Y, R–Y and B–Y).

Video outputs

Audio inputs and outputs

⓮ MONITOR AUDIO connector (RCA)
Outputs an audio signal for the video monitor.



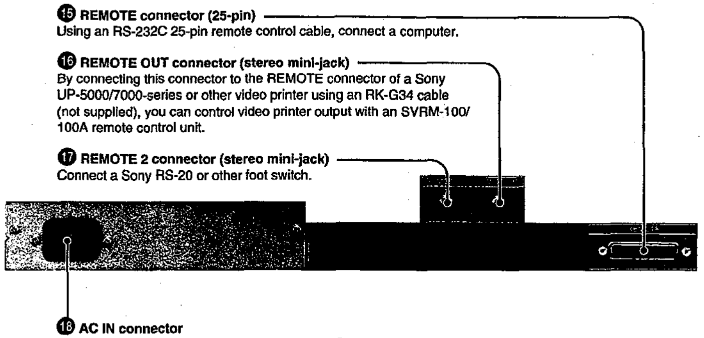
⓫ AUDIO INPUT 600 Ω ON/OFF switch
Sets the input impedance of audio input channels 1 and 2 to 600 Ω (ON position) or to 1 kΩ (OFF position).

⓬ AUDIO INPUT CH-1 and CH-2 connectors (XLR 3-pin)
Connect audio input signals from a video deck or from audio equipment.

⓭ AUDIO OUTPUT CH-1 and CH-2 connectors (XLR 3-pin)
Output audio signals.

Audio inputs and outputs

Power and control signals



⑮ **REMOTE connector (25-pin)**
Using an RS-232C 25-pin remote control cable, connect a computer.

⑯ **REMOTE OUT connector (stereo mini-jack)**
By connecting this connector to the REMOTE connector of a Sony UP-5000/7000-series or other video printer using an RK-G34 cable (not supplied), you can control video printer output with an SVRM-100/100A remote control unit.

⑰ **REMOTE 2 connector (stereo mini-jack)**
Connect a Sony RS-20 or other foot switch.

⑱ **AC IN connector**
Use the supplied power cord to connect to an AC power supply.

Power and control signals

Chapter 3
Preparations

This chapter describes various preparatory aspects of operation of this unit.

Before Use .... 3-2 (E)
Cassettes .... 3-3 (E)
  Usable Cassettes .... 3-3 (E)
  Inserting and Ejecting a Cassette .... 3-3 (E)
  Record Inhibit Function .... 3-4 (E)
Reference Video Signals .... 3-5 (E)

Before Use

Safety notes

Power supply

- Ensure that the unit is connected to a power supply of the correct rating.
- Do not place any heavy objects on the power cord, and be careful not to damage the power cord. Using a damaged power cord is dangerous.
- When disconnecting the power cord, not pull the cord itself, hold the plug while pulling it out.

Do not disassemble the unit

Do not remove the casing. If you insert your hand there is a danger of electric shock.

Do not drop foreign objects into the casing

If flammable objects, metal objects, water or other undesirable substances enter the casing, this can be a cause of malfunction.

In the event of a malfunction

If there should be a strange sound or smell or smoke emanating from the unit, immediately power off the unit, and disconnect the power supply and all signal connections, then refer to your supplier or Sony service representative.

Notes on operation

Operation and storage locations

Avoid operation or storage in any of the following places.

- Locations subject to extremes of temperature (operating temperature range 5 °C to 40 °C (41 °F to 104 °F))
- Locations subject to direct sunlight for long periods, or close to heating appliances (Note that the interior of a car left in summer with the windows closed can exceed 50 °C (122 °F)).

Operate the unit in a horizontal position

This unit is designed to be operated in a horizontal position. Do not operate it on its side, or tilted through an excessive angle (exceeding 20 °).

Avoid violent impacts

Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

Do not obstruct ventilation openings

To prevent the unit from overheating, do not obstruct the ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

Care

If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of extreme dirt, use a cloth steeped in a neutral detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinners, insecticides, or other volatile solvents may result in deforming the casing or damaging the finish.

Shipping

- Always remove the cassette before shipping the unit.
- Pack the unit in its original carton or equivalent packing, and take care not to impart violent shocks in transit.

Cassettes

Usable Cassettes

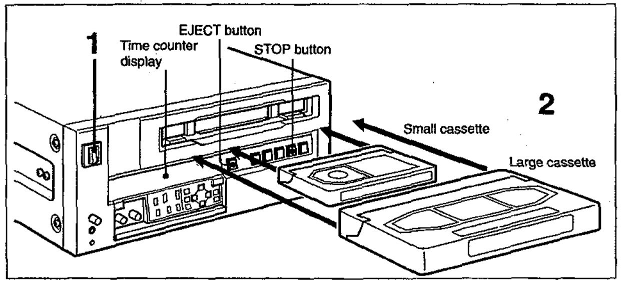
This unit only accepts metal tapes.
Use the following $^1/_2$-inch Betacam SP cassettes.

	Metal tape
Small (S) cassettes	BCT-5MA/10MA/20MA/30MA, UVWT-10MA/20MA/30MA
Large (L) cassettes	BCT-5MLA/10MLA/20MLA/30MLA/60MLA/90MLA, UVWT-60MLA/90MLA

Inserting and Ejecting a Cassette

Always check that the unit is powered on before attempting to insert or eject a cassette.

Inserting a cassette



Inserting a cassette

1 Turn the POWER switch on.

2 Check the following points, then insert the cassette.
- The cassette must be inserted with the side that the tape is visible uppermost.
- There must be no slack in the tape.
- There must be no message "HUMID !" in the time counter display.

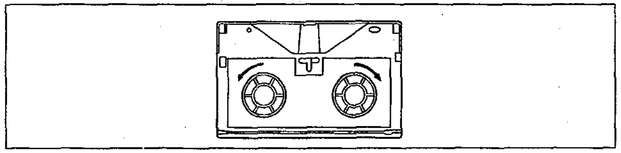
For details of how to remove slack in the tape, see the section "Removing slack in the tape" on the next page.

If the message "HUMID !" appears in the time counter display, see the section "Condensation" (page 7-3(E)).

To insert a small cassette, align it with the marks on the cassette compartment.

The cassette is automatically drawn into the unit, and the tape wound round the head drum. The tape is stationary while the head drum rotates, and the STOP button lights.

Removing slack in the tape
Carefully rotate one of the reels with your finger in the direction of the arrows until it stops.



Removing slack in the tape

No double insertion of cassettes
When you insert a cassette, the orange lock-out plate appears in the cassette compartment to prevent double insertion.

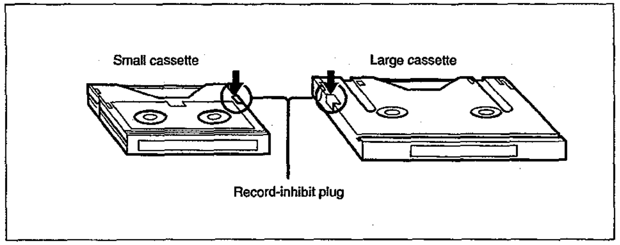
Ejecting the cassette

Press the EJECT button.

The tape is wound back into the cassette (this takes several seconds), and then the cassette is ejected from the unit.
If the time counter display is showing CTL values, it is reset.

Record Inhibit Function

To protect recorded material which you wish to keep, press in the record-inhibit plug on the cassette.



Record-inhibit plug

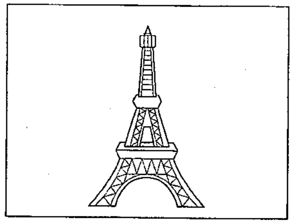
When you insert a cassette with the record-inhibit plug pushed in into the cassette compartment, the REC INHIBIT indicator lights, and it is not possible to record.

To re-record on the cassette, return the record-inhibit plug to its original position.

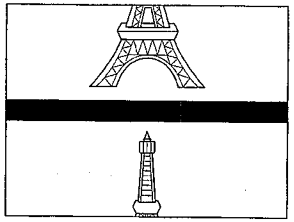
Reference Video Signals

In oder to enable the time base stabilizer (TBS) to operate correctly, and ensure stable operation, you must input a composite video signal synchronized to the signal being used to the REF. VIDEO INPUT connector.

If no reference video signal is input, then during recording or in EE mode the monitor screen will tend to drift vertically, as shown in the figure below.

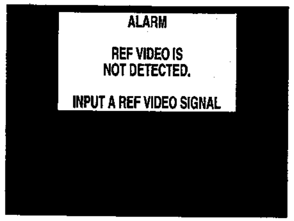


With reference video



No reference video

The monitor screen and the time counter display also show alarm messages. (Example: When the VIDEO 2 (SUPER) OUTPUT connector is used with the REF. ALARM set to "ON" in the menu.)

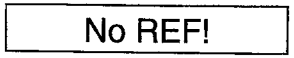


ALARM

REF VIDEO IS
NOT DETECTED.

INPUT A REF VIDEO SIGNAL

Monitor screen



No REF!

Time counter display

During playback, a monitor picture is normally stable without a reference video signal input.

For details of changing the menu settings, see the section "Menu Operations" (page 6-10(E)).

Using RGB signals

Input

Input a sync signal synchronized to the RGB signal into the REF. VIDEO INPUT connector whether the RGB signal includes a sync signal or not.

Output

You can select in a menu whether or not to add a sync signal to the green signal. In either case the signal output from the RGB SYNC OUTPUT connector is always a composite sync signal (no burst signal).

For details of menu settings, see the item "SYNC ON GREEN" (page 6-8(E)) in Chapter 6 "Menus."

Chapter 4
Playback and Recording

This chapter describes the preparation necessary before using the unit for playback and recording, including connections and switch settings, and operating procedures. It also describes the text information which can be superimposed on the monitor screen.

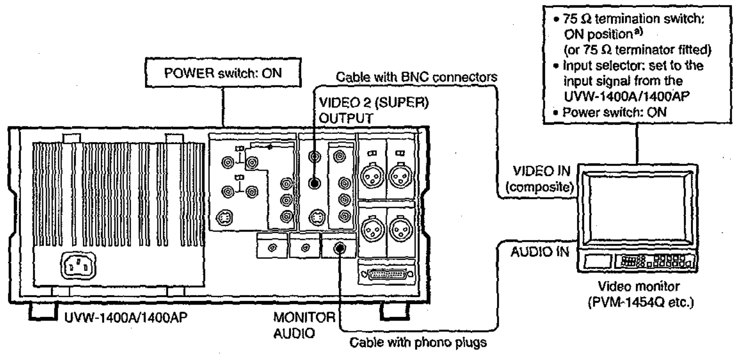
Playback .... **4-2 (E)**
  Preparation for Playback .... 4-2 (E)
  Playback Operation .... 4-3 (E)
  Repeat Playback .... 4-4 (E)
  Triggering a Video Printer .... 4-8 (E)
Recording .... **4-10 (E)**
  Preparation for Recording .... 4-10 (E)
  Recording Operation .... 4-12 (E)
  Backspace Edit .... 4-13 (E)
  Using a Foot Switch for Recording Control .... 4-14 (E)
Superimposed Text Information .... **4-15 (E)**

Playback

This section describes the connections, switch settings, and basic operating procedures for playback of both video and audio signals.

Preparation for Playback

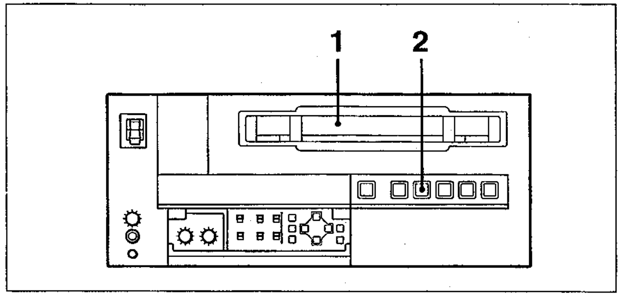
Connect the unit to the monitor and make the switch settings as shown in the following figure.


POWER switch: ON
Cable with BNC connectors
VIDEO 2 (SUPER) OUTPUT
• 75 Ω termination switch: ON position[a] (or 75 Ω terminator fitted)
• Input selector: set to the input signal from the UVW-1400A/1400AP
• Power switch: ON
VIDEO IN (composite)
AUDIO IN
Video monitor (PVM-1454Q etc.)
UVW-1400A/1400AP
MONITOR AUDIO
Cable with phono plugs

a) The VIDEO IN connectors of PVM-1454Q are provided with automatic termination function.

Connections and switch settings

Playback Operation



Playback

1 Insert **a metal tape** cassette.

The STOP button lights, then a few seconds later the tape is ready to start running. At this point a still picture appears on the monitor.
Always be sure to use a metal tape.

2 Press the PLAY button.

Playback begins.

To stop playback

Press the STOP button.

This puts the UVW-1400A/1400AP into stop mode. This unit automatically enters standby-off mode if it is left in stop mode for eight minutes.

You can change the time to switch to stand-by off mode in the TAPE PROTECTION menu. For details, see under "TAPE PROTECTION" (page 6-7(E)).

If the tape reaches the end during playback

The tape is automatically rewound to the beginning and the unit stops.
You can disable this automatic rewind function using the menu.

For details, see "AUTO REW" (page 6-4(E)).

Adjusting the audio playback volume

Carry this out on the monitor.

Simple search function

With the F.FWD/REW item in the AUTO EE SELECT of OPERATIONAL FUNCTION menu set to PB, holding down the F FWD or REW button provides a monochrome search function at 16 times normal speed in the foward or reverse direction respectively. Press the PLAY button again to return to normal playback.

Repeat Playback

This unit has a repeat playback function, for continuous playback of video between selected top and end points.

Repeat top and end points

Repeat top points	Repeat end points
• A point set by user • Top of tape	• B point set by user • End of tape • End of recorded materials

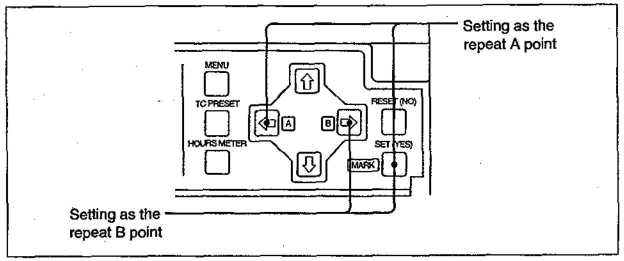
Select the current repeat top and end points with the REPEAT TOP and REPEAT END menu items, located under the REPEAT FUNCTION menu.
If you set the REPEAT MODE item located under the REPEAT FUNCTION menu to ON (the REPEAT indicator on the front panel lights), the tape is cued up to the repeat top point when you power the unit on or press the PLAY button.

Note

In repeat playback mode, pressing the PLAY button cues up the repeat top point instead of starting normal playback. If you want to carry out normal playback, you will have to set the REPEAT MODE menu item to OFF.

For more information about the REPEAT FUNCTION menu, see page 6-3(E).

Setting the current tape position as the repeat A or B point



Setting the current tape position as the repeat A or B point

While holding down the SET (YES) (MARK) button on the subsidiary control panel, press the ⇤ (A) or ⇥ (B) button. The current tape position (time code value) is set as the repeat A or B point, and a message "A set" or "B set" flashes momentarily in the time counter display.
Once set, an A or B point time code value is held in the unit's non-volatile memory until changed. It is not lost when the unit is powered off.

Note

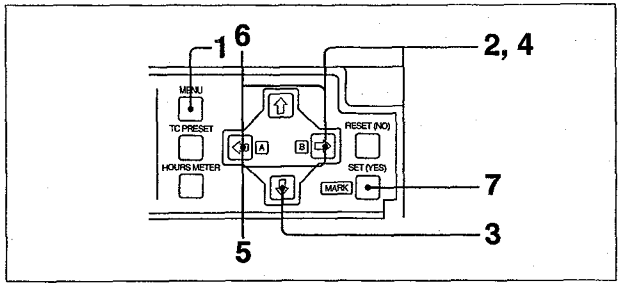
You can only set a time code value as an A or B point. You cannot set a CTL value even when you set the CTL/LTC/U-BIT switch to CTL. Before setting an A or B point, make sure that time codes are recorded on the tape.

To check an A or B point

Press the ⇤ (A) or ⇥ (B) button. While the button is held down, the A or B point time code value is displayed on the monitor and in the time counter display.
If you hold down both the ⇤ (A) or ⇥ (B) buttons, the value shown is the B point time code value minus the A point time code value. If the A point time code value is greater than the B point time code value, a minus sign (–) is shown before the value.

Changing A and B points

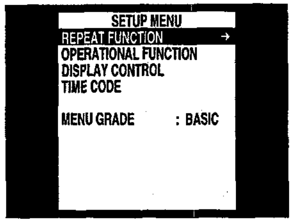
Proceed as follows to change A and B points.



Changing A and B points

1 Press the MENU button.

The setup menu appears.



```
SETUP MENU
REPEAT FUNCTION          →
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE

MENU GRADE       : BASIC
```

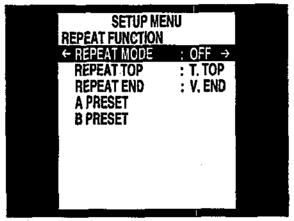
Monitor

REPEAT FUNC

Time counter display

2 Press the ⇥ (B) button.

The REPEAT FUNCTION menu screen appears.



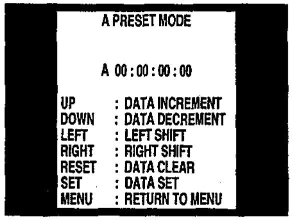
```
SETUP MENU
REPEAT FUNCTION
← REPEAT MODE    : OFF →
  REPEAT TOP     : T. TOP
  REPEAT END     : V. END
  A PRESET
  B PRESET
```

Monitor

REPEAT MODE

Time counter display

3 Use the [↓] button to highlight the A PRESET or B PRESET item in reverse video.


A PRESET MODE

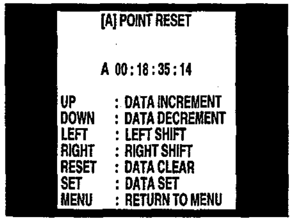
A 00 : 00 : 00 : 00

UP : DATA INCREMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
MENU : RETURN TO MENU

Monitor

4 Press the [→] (B) button.

The A point or B point reset screen appears. The first item in the screen shows the current time code value of the A or B point.


[A] POINT RESET

A 00 : 18 : 35 : 14

UP : DATA INCREMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
MENU : RETURN TO MENU

Monitor

5 Press the [←] (A) or [→] (B) button until the digit that you want to change starts flashing.

Each press of the button causes the digit to the left or right to begin flashing. Holding the button down moves he flashing digit continuously. If you want to clear the value, press the RESET (NO) button. The value is cleared to 00:00:00:00, and the leftmost digit begins flashing.

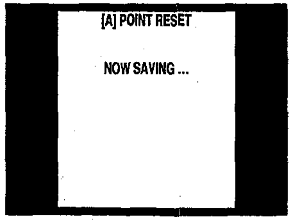
6 Press the [↑] or [↓] button to increment or decrement the value.

Each press of the button increments or decrements the value. Holding the button down increments or decrements the value continuously. To change other digits, return to step **5**.

(Continued)

7 Press the SET (YES) (MARK) button to set the displayed value.

The value is saved as the A or B point, and the display changes to the main setup menu.
If you want to discard the changed value, press the MENU button to return to the main setup menu immediately. To exit the menu system, press the MENU button from the main setup menu. If you have made any changes to menu items, the following screen appears.


[A] POINT RESET

NOW SAVING ...

Monitor

Note

To prevent the loss of data, do not power the unit off while this screen is displayed.

Triggering a Video Printer

When using a Sony UP-5000/7000-series or other video printer, by connecting the REMOTE OUT connector on the rear panel to the REMOTE 2 connector of the printer, you can control video printer output with an optional SVRM-100/100A remote control unit.

1 Connect the SVRM-100/100A, printer, monitor and any other equipment to this unit. Connect the REMOTE OUT connector to the REMOTE 2 connector of the printer, using an RK-G34 cable (not supplied).

For details of the basic connections between this unit and the video printer, refer to the operating instructions for the printer.

2 Set the output timing according to the type of printer connected, by a menu selection.

For details of the output timing settings, see the item "VIDEO PRINTER" (page 6-9(E)) in Chapter 6 "Menus."

3 Display the frame to be printed as a still picture in jog/shuttle mode or by pausing.

4 Press the FREEZE button on the SVRM-100/100A.

This unit carries out a preroll and playback sequence, and outputs the specified frame to the video printer.

Triggering a video printer during playback

1 Carry out step **1** in the preceding procedure.

2 Press the PLAY button on the SVRM-100/100A.

This starts playback on this unit.

3 Press the FREEZE button on the SVRM-100/100A when the frame to be printed appears on the monitor.

This outputs the specified frame to the video printer.

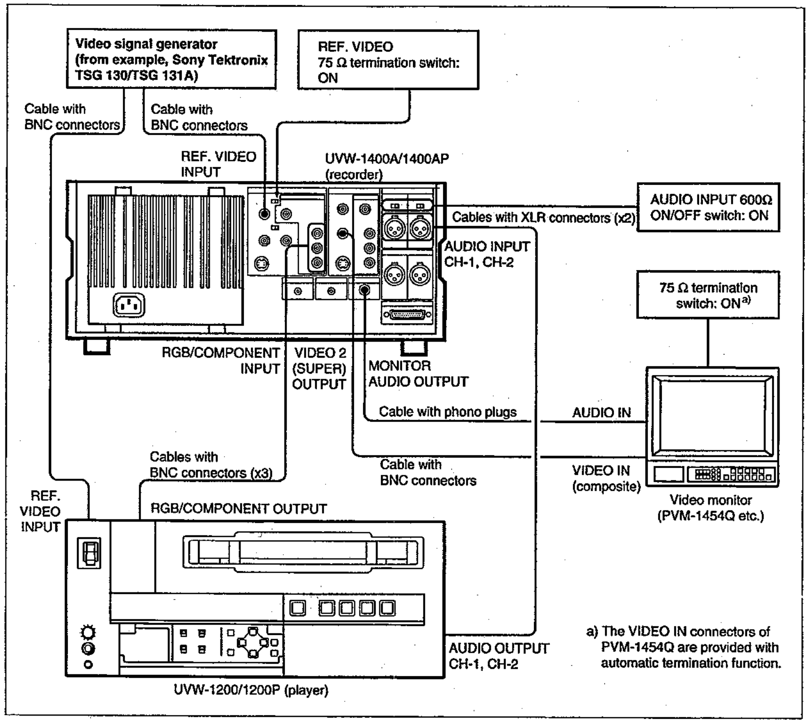
For details, refer to the Operating Instructions for the SVRM-100 or SVRM-100A.

Recording

This section describes the connections, switch settings, and operating procedures for recording a component video signal and audio signal.

Preparation for Recording

Connect this unit as the recorder and a UVW-1200/1200P as the player as shown in the following figure. To check the video and audio signals being recorded, connect this unit to a monitor as described in the section "Playback" *(page 4-2(E))*.


Video signal generator (from example, Sony Tektronix TSG 130/TSG 131A)
REF. VIDEO 75 Ω termination switch: ON
Cable with BNC connectors
Cable with BNC connectors
REF. VIDEO INPUT
UVW-1400A/1400AP (recorder)
Cables with XLR connectors (x2)
AUDIO INPUT 600Ω ON/OFF switch: ON
AUDIO INPUT CH-1, CH-2
75 Ω termination switch: ON^a)
RGB/COMPONENT INPUT
VIDEO 2 (SUPER) OUTPUT
MONITOR AUDIO OUTPUT
Cable with phono plugs
AUDIO IN
Cables with BNC connectors (x3)
Cable with BNC connectors
VIDEO IN (composite)
Video monitor (PVM-1454Q etc.)
REF. VIDEO INPUT
RGB/COMPONENT OUTPUT
AUDIO OUTPUT CH-1, CH-2
UVW-1200/1200P (player)

a) The VIDEO IN connectors of PVM-1454Q are provided with automatic termination function.

Connections

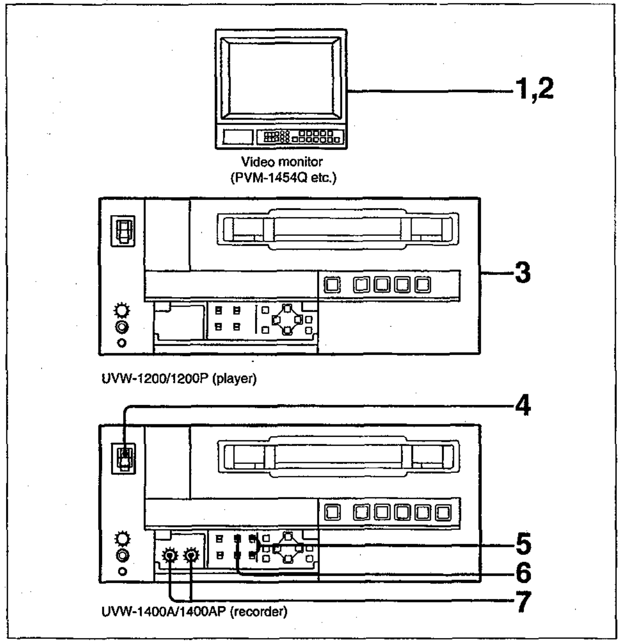
Note

If you do not input a reference video signal, the monitor picture will be subject to vertical instability. When carrying out recording, always input a reference video signal.

For details of reference video signals, see the section "Reference Video Signals" (page 3-5(E)).

Switch and control settings

After completing the connections, make the switch and control settings as follows.



Switch and control settings

1 Power on the video monitor.

2 Set the input selector of the monitor to the input connector connected to the UVW-1400A/1400AP.

3 Following the instructions in the appropriate operation manual, and prepare the player for playback.

4 Power on the UVW-1400A/1400AP.

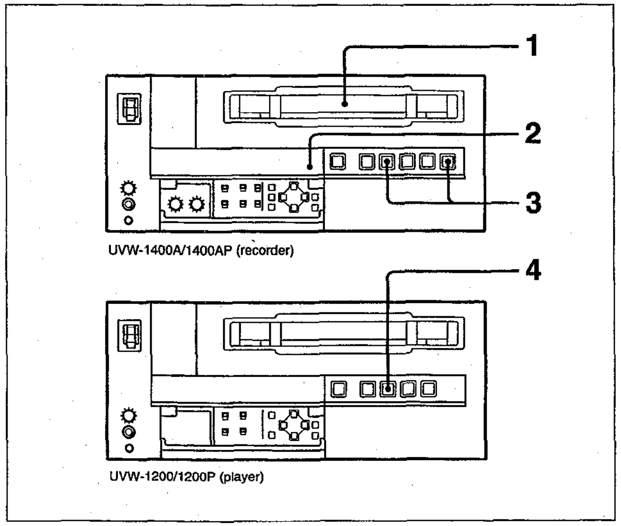
5 Set the upper VIDEO IN selector switch to COMPONENT, and the lower VIDEO IN selector switch to Y-R, B.

6 Set the CTL/LTC/U-BIT switch according to the time data to be used.

7 Adjust the AUDIO INPUT LEVEL controls so that the audio level meters indicate around 0 VU when the audio signal is at its maximum.

Recording Operation

In order to carry out recording of the video and audio signals, check that you have made the connections and carried out the switch setting procedure correctly, then use the following procedure.



Recording

1 Insert a cassette in the UVW-1400A/1400AP.

Always be sure to use **a metal tape.**
Before inserting the cassette, check that it is not record-inhibited.
For details see the section "Record Inhibit Function" (page 3-4(E)).

2 Check that the REC INHIBIT indicator is not lit.

3 Hold down the REC button, and press the PLAY button.

Recording starts.

4 Press the PLAY button on the player.

Playback starts.

To stop recording
Press the STOP button.

Backspace Edit

This unit has a backspace edit function, similar to function provided by the PAUSE button on video camera recorders. It allows you to pause and resume recording with no breakup in the picture.
You can use two kinds of backspace edit recording when controlling this unit from the optional SVRM-100/100A remote control unit or a computer connected to the REMOTE connector on the rear panel.

- Continuous assembly during recording
- Insertion of new shots at any point on the tape

Notes about Inserting new shots

- When you press the REC button, the unit requires a moment before entering REC PAUSE mode.
- Continuity of video, audio, time code and color framing information is guaranteed at the beginning of insertion. However, in the portion immediately after insertion, low-frequency range noise in the video signals increases, and the audio signals of the new and old shots are mixed.

This section will explain how to use the SVRM-100/100A Remote Control Unit to carry out backspace edit recording. If you are controlling the unit from a computer, replace each step in the operating procedures with the corresponding remote control command.

Note

When you use a computer, set the REMOTE/LOCAL switch on this unit to REMOTE.

Continuous assembly during recording

This procedure uses the buttons on the SVRM-100/100A remote control unit.

1 Press the PLAY and REC buttons simultaneously.

Recording begins. Continue recording for at least two seconds before proceeding to the next step.

2 Press the PAUSE button.

The tape is rewound 15 frames, and the unit enters REC PAUSE mode.

3 Press the PAUSE button again.

The tape is run in EE mode up to the point where recording was interrupted, and then recording resumes. Continuity of video, audio and time code is maintained, and video and audio quality is not impaired at the beginning of the recording.
Note that recording cannot be interrupted again until it has continued for at least 15 frames, even if you press the PAUSE button again.

Insertion of new shots at any point on the tape

This procedure uses the buttons on the SVRM-100/100A remote control unit.

1 Rotate the search dial to cue up the insertion point.

2 Press the PLAY and PAUSE buttons simultaneously.

The unit enters PLAY PAUSE mode.

3 Press the REC button.

The tape is rewound for about 2 seconds, and then the unit enters playback mode and runs the tape to a point 15 frames before the insertion point, and enters REC PAUSE mode.

4 Press the PAUSE button.

The tape is run in EE mode up to the point cued up in step **1**, and recording starts.
In the portion immediately after insertion, low-frequency range noise in the video signals increases, and the audio signals of the new and old shots are mixed.
Note that recording cannot be interrupted until it has continued for at least 15 frames, even if you press the PAUSE button again.

Notes about using the backspace edit function

- In order to protect the tape, REC PAUSE mode is canceled automatically if it continues for longer than the time selected with the STILL TIMER menu item.
- There must be at least two seconds of recorded material on the tape before the backspace edit starting point. If there is not, the unit will not enter REC PAUSE mode.

Using a Foot Switch for Recording Control

By connecting a Sony RS-20 or other foot switch to the REMOTE 2 connector on the rear panel, you can start and pause recording by foot control.

It is necessary to make a menu selection according to the type of foot switch you are using.

For details of the menu setting, see the item "FOOT SWITCH" (page 6-9(E)) in Chapter 6 "Menus."

Superimposed Text Information

When the subsidiary control panel CHARACTER switch is in the ON position, the video signal output from the VIDEO 2 (SUPER) OUTPUT connector includes superimposed indications of time data and the operating state of this unit.

Selecting the information displayed and the character type and position of the indications

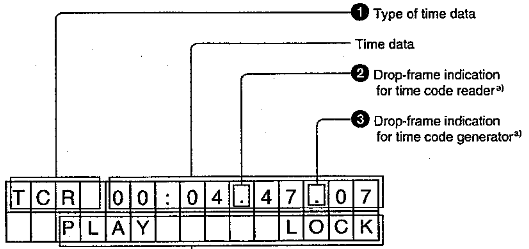
The information displayed and the character type and position of the indications can be selected by using the menu item "DISPLAY CONTROL." The factory default settings are as follows.

Information displayed : Time data selected by the CTL/LTC/U-BIT switch, and the operating status of the unit

Character type : White characters on a black background

Character position : Bottom center of the screen

For details of the setting method, see under "DISPLAY CONTROL" (page 6-5(E)).



❶ Type of time data
Time data
❷ Drop-frame indication for time code reader[a]
❸ Drop-frame indication for time code generator[a]
T C R 0 0 : 0 4 . 4 7 . 0 7
P L A Y L O C K
❹ UVW-1400A/1400AP operating status

a) This character can appear on the UVW-1400A only. The character to appear in these two columns is always a colon (:) on the UVW-1400AP.

Displayed information (factory default)

❶ Type of time data

This indicates the type of time data as follows.

Indication	Meaning
CTL	CTL counter data
TCR	LTC reader data
UBR	LTC reader user's bit data
TCG	Time code data from time code generator
UBG	User's bit data from time code generator
T*R	Time code data from time code reader. Interpolated by the time code reader to make up for the time code data not correctly read from the tape.
U*R	User's bit data from time code reader. Last data is retained by the time code reader, as the new data has not been read correctly from the tape.

❷ Drop-frame indication for time code reader (on UVW-1400A only)

" . " : A single dot indicates drop-frame mode.
" : " : Two dots (i.e. a colon) indicate non-drop-frame mode.

❸ Drop-frame indication for time code generator (on UVW-1400A only)

" . " : A single dot indicates drop-frame mode.
" : " : Two dots (i.e. a colon) indicate non-drop-frame mode.

❹ UVW-1400A/1400AP operating status

Indication		Operating status
THREADING		Cassette is inserted, and tape is being threaded.
UNTHREADING		Tape is being unthreaded to eject cassette.
CASSETTE OUT		No cassette is inserted.
STANDBY OFF		Tape is not on standby.
T.RELEASE		Tape tension is released.
STOP		Tape is stopped.
F.FWD		Fast forward
REW		Rewind
PREROLL		Preroll
PLAY		Play (servo not locked)
PLAY	LOCK	Play (servo locked)
PLAY	PAUSE	Playback pause
REC		Recording (servo not locked)
REC	LOCK	Recording (servo locked)
REC	PAUSE	Recording pause
JOG	STILL	Still picture in jog mode
JOG	FWD	Jog mode in forward direction (▶ indicator lights)
JOG	REV	Jog mode in reverse direction (◀ indicator lights)
SHUTTLE	(speed)	Shuttle mode (playback speed)
PAUSE		Shuttle mode playback pause

Chapter 5
Time Data

The time data used by this unit for both recording and display include CTL signal count values, longitudinal time code (LTC), and user's bit data. This chapter describes how to display time data, and how to set LTC and user's bit values.

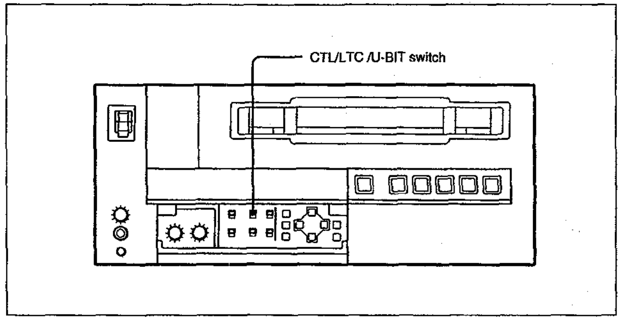
Displaying Time Data ....5-2 (E)
Setting Longitudinal Time Code and User's Bits ....5-3 (E)

Displaying Time Data

During recording or playback, you can display the time data selected on this unit on the monitor and on the time counter display.

On the time counter display

Use the CTL/LTC/U-BIT switch to select the data to be displayed on the time counter display.



CTL/LTC/U-BIT switch

Resetting the CTL data displayed
Press the RESET (NO) button.

The indication in the time counter display is reset to "0:00:00:00".

On the monitor screen

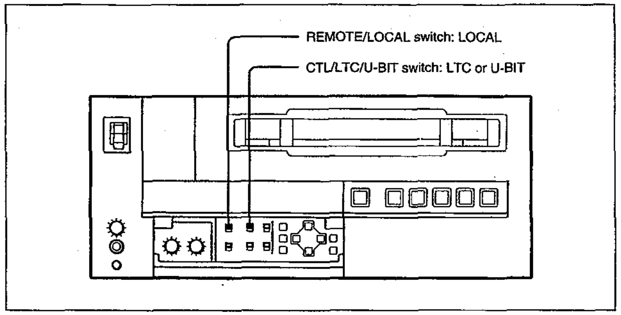
See the section "Superimposed Text Information" (page 4-15(E)).

Setting Longitudinal Time Code and User's Bits

Using the internal time code generator it is possible to preset the longitudinal time code (LTC) value to be recorded on the tape to any desired initial value.
This section describes how to preset the LTC value, and also how to preset the user's bit data which is also written on the same track.

Switch and menu settings

Carry out the following switch and menu settings.


REMOTE/LOCAL switch: LOCAL
CTL/LTC/U-BIT switch: LTC or U-BIT

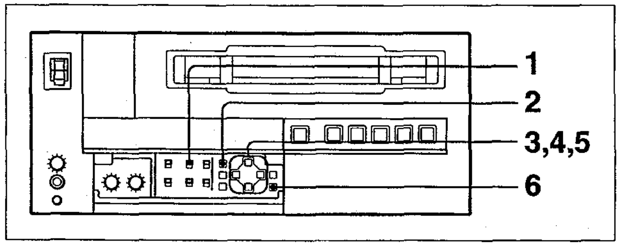
Switch settings

Menu settings

Mode	Setting
RUN MODE	"FREE RUN" or "REC RUN"
DF MODE (for UVW-1400A only)	Normally "DF"

For details of the RUN MODE and DF MODE settings, see under "TIME CODE" (page 6-6(E)).

Setting procedure



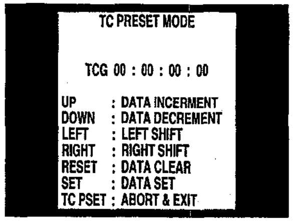
Setting the initial value for time code or user's bits

1 Set the CTL/LTC/U-BIT switch to LTC or U-BIT, to display the required time data on the monitor and time counter display.

2 Press the TC PRESET button.

The current setting is displayed on the monitor screen and the time counter display. At this point the leftmost digit flashes.

One of the following displays appears on the monitor screen.

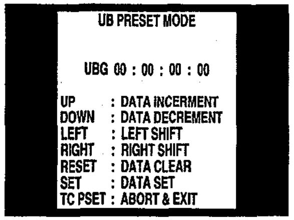


TC PRESET MODE

TCG 00 : 00 : 00 : 00

UP : DATA INCERMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
TC PSET : ABORT & EXIT

Time code presetting



UB PRESET MODE

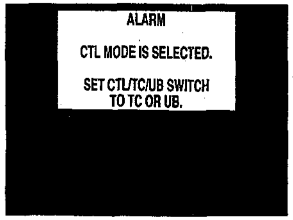
UBG 00 : 00 : 00 : 00

UP : DATA INCERMENT
DOWN : DATA DECREMENT
LEFT : LEFT SHIFT
RIGHT : RIGHT SHIFT
RESET : DATA CLEAR
SET : DATA SET
TC PSET : ABORT & EXIT

User's bit presetting

Note

If you press the TC PRESET button while CTL value is displayed, the following alarm messages appear on the monitor screen and the time counter display.



ALARM

CTL MODE IS SELECTED.

SET CTL/TC/UB SWITCH
TO TC OR UB.

CTL mode!

Set the CTL/LTC/U-BIT switch to LTC or U-BIT.

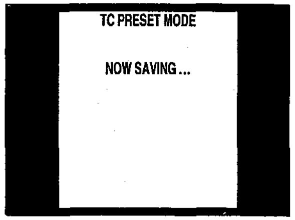
3 Use the ⇤ (A) and ⇥ (B) buttons to select the digit in the value which is flashing.

4 Use the ⇩ and ⇧ buttons to adjust the value of the flashing digit.
Note that user's bit data values are in hexadecimal (digits 0-9 and A-F).

5 Repeat steps **3** and **4** as required to set the required value.
To set the value to 00:00:00:00, press the RESET (NO) button.

6 Press the SET (YES) (MARK) button.

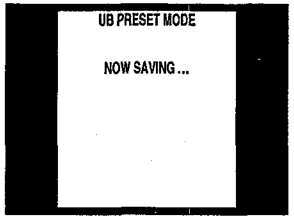
Either of the two displays shown immediately below appears on the monitor screen and the third display shown below in the time counter display.



TC PRESET MODE

NOW SAVING...

Monitor screen



UB PRESET MODE

NOW SAVING...

Monitor screen

Saving...

Time counter display

Once the setting is saved, the monitor screen and time counter display return to normal.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- LTC and users bits cannot be set while the unit is in REC PAUSE mode. Exit the REC PAUSE mode before making these settings.

Internal time code generator running modes

There are two different modes of operation for the internal time code generator, selected by the RUN MODE setting as follows.
"FREE RUN": The time code generator begins to run from the instant the preset value is saved.
"REC RUN": The time code generator runs only during recording.

Presetting the time data value to reflect real time

In the menu, set RUN MODE to "FREE RUN", and set the time data value to the current time.

Chapter 6
Menus

This chapter describes the organization of the principal set-up menus (selecting the superimposed information on the monitor screen, time code, run mode, etc.) and how to use them.

Menu Organization..**6-2 (E)**
  Hierarchical Structure ....6-2 (E)
  Menu Screens...6-3 (E)
Menu Operations ....**6-10 (E)**
  Buttons Used to Change the Setting ....6-10 (E)
  Operation Sequence ....6-11 (E)

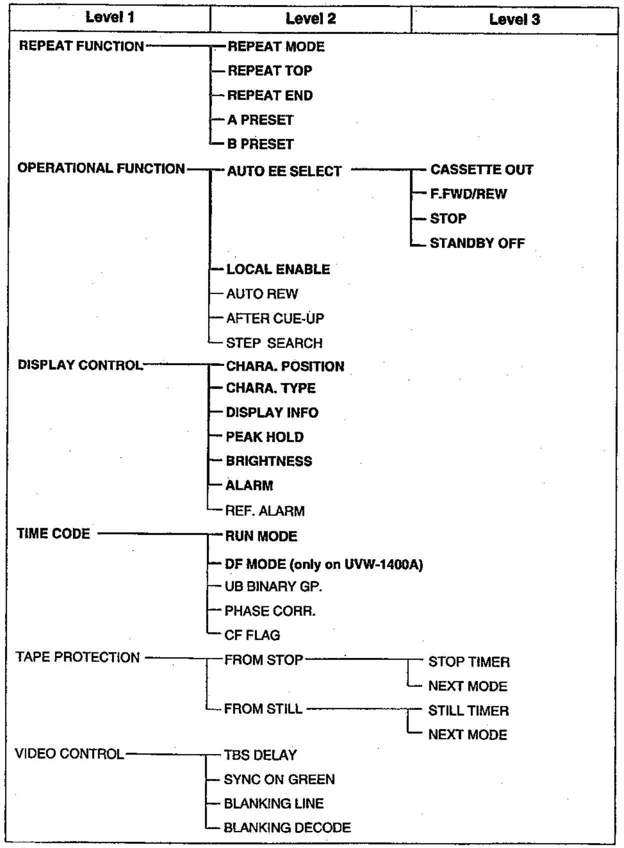
Menu Organization

Hierarchical Structure

The menu screens are arranged in a three-level tree structure, as shown in the figure below. The top-level selections (level 1) access the main divisions of the settings, and except for the MENU GRADE item, the settings themselves are made on levels 2 and 3. The screens are divided into two groups: the basic settings, to which frequent access is normally required, and extended settings, which are less frequently used.

In the following figure, bold lines indicate the basic menu screens, and thin lines the extended menu screens.

Menu organization



Level 1
Level 2
Level 3
REPEAT FUNCTION
REPEAT MODE
REPEAT TOP
REPEAT END
A PRESET
B PRESET
OPERATIONAL FUNCTION
AUTO EE SELECT
CASSETTE OUT
F.FWD/REW
STOP
STANDBY OFF
LOCAL ENABLE
AUTO REW
AFTER CUE-UP
STEP SEARCH
DISPLAY CONTROL
CHARA. POSITION
CHARA. TYPE
DISPLAY INFO
PEAK HOLD
BRIGHTNESS
ALARM
REF. ALARM
TIME CODE
RUN MODE
DF MODE (only on UVW-1400A)
UB BINARY GP.
PHASE CORR.
CF FLAG
TAPE PROTECTION
FROM STOP
STOP TIMER
NEXT MODE
FROM STILL
STILL TIMER
NEXT MODE
VIDEO CONTROL
TBS DELAY
SYNC ON GREEN
BLANKING LINE
BLANKING DECODE

Menu organization (continued)

Level 1	Level 2	Level 3
INTERFACE CONTROL	RS-232C BPS	
	FOOT SWITCH	
	VIDEO PRINTER	
MENU GRADE		

Menu Screens

The table below lists the menu screens and explains the meaning of each setting.

In the table the following conventions are used:

- Factory default settings are preceded by an asterisk (*).
- Each indication appears twice: the upper version is what appears on the monitor screen, and the lower version in parentheses appears on the time counter display.
- The time counter display indications are preceded by a number of angle brackets: '>' indicates an item in a level 2 menu, and '>>' and '>>>' indicate an item or a parameter in a lower level menu.

Menu selections

REPEAT FUNCTION: Repeat playback settings (REPEAT FUNC)	**Description of settings**
REPEAT MODE **(>REPEAT MD)** Whether to execute repeat playback when PLAY button is pressed.	* OFF(>>OFF): Do not execute repeat playback. ON(>>ON): Execute repeat playback.
REPEAT TOP **(>REPEAT TOP)** Select the repeat top point.	* TAPE TOP(>>Tape top): The top of the tape is the repeat top point. A POINT(>>A point): The user-selected A point *(see page 4-4(E))* is the repeat top point.
REPEAT END **(>REPEAT END)** Select the repeat end point.	* VIDEO END(>>VD end): The end of the recorded portion of the tape is the repeat end point. TAPE END(>>Tape end): The tape end is the repeat end point. B POINT(>>B point): The user-selected B point *(see page 4-4(E))* is the repeat end point.
A PRESET **(>A preset)** Change the repeat A point.	For details about operations, see page 4-4(E). ⇤ (A), ⇥ (B) buttons: Select a digit to be modified. ⇧, ⇩ buttons: Increment or decrement the value. SET (YES) (MARK) button: Set the displayed value. RESET (NO) button: Clear the A point to 00:00:00:00. MENU button: Return to the menu screen.
B PRESET **(>B preset)** Change the repeat B point.	For details about operations, see page 4-4(E). ⇤ (A), ⇥ (B) buttons: Select a digit to be modified. ⇧, ⇩ buttons: Increment or decrement the value. SET (YES) (MARK) button: Set the displayed value. RESET (NO) button: Clear the B point to 00:00:00:00. MENU button: Return to the menu screen.

(Continued)

Menu Organization

Menu selections (continued)

OPERATIONAL FUNCTION: Operation settings (Operational)		**Description of settings**
AUTO EE SELECT **(> Auto EE)** Determine whether the unit enters EE mode or PB mode when audio and video signals from other equipment are input.	**CASSETTE OUT** **(>> Cass. out)** When the cassette has been ejected	* EE (>>> EE): Output audio and video signal input from other equipment PB (>>> PB): Mute audio and video signal input
	F. FWD/REW **(>> F. FWD/REW)** Operations when in fast forward or rewind mode **Note** Set this item to PB when you want to use the F FWD and REW buttons to view playback at 16 times normal speed. If this item is set to EE, holding down the F FWD and REW buttons produces EE pictures.	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Mute audio and video signal input
	STOP **(>> STOP)** Operations when in stop mode	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Output audio and video signal recorded on a tape
	STANDBY OFF **(>> STBY OFF)** Operations when in standby off mode	EE (>>> EE): Output audio and video signal input from other equipment * PB (>>> PB): Mute audio and video signal input
LOCAL ENABLE **(> Local ENA)** Select which of the tape transport control buttons (EJECT, REW, PLAY, F FWD, STOP and REC) operate when the REMOTE/LOCAL switch is set to REMOTE.		ALL DISABLE (>> ALL DIS): All of the tape transport control buttons are disabled. * STOP & EJECT (>> STOP&EJ): Only the STOP and EJECT buttons are enabled. ALL ENABLE (>> ALL ENA): All of the tape transport control buttons are enabled, and settings such as preroll time change or time data display selection are effective.
AUTO REW (> Auto REW) Whether to rewind automatically when playback reaches the end of tape		* ENABLE (>> ENABLE): Rewind automatically. DISABLE (>> DISABLE): Do not rewind automatically.
AFTER CUE-UP (> After CUE) Operating mode after cue-up		STOP (>> STOP): Stop mode * STILL (>> STILL): Search mode still
STEP SEARCH (> Step SRCH) Determine whether or not the tape is transported in units of fields during jog/shuttle playback.		OFF (>> OFF): Transport the tape regardless of fields. In a still picture in jog/shuttle mode or when normal playback is paused, guard bands (noise bars) appear at any location in the picture. * ON (>> ON): Transport the tape in units of fields. In a still picture in jog/shuttle mode or when normal playback is paused, guard bands (noise bars) appear at the top and bottom of the picture.

Menu selections (continued)

DISPLAY CONTROL: Settings related to indications (Display) on the monitor and the unit	Description of settings
CHARA. POSITION **(> Chara pos)** Position of text superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor Note If time code values which appear superimposed on the monitor screen are to be recorded on another VTR, position them in the lower two-thirds of the screen. Time code values displayed in the top one-third of the monitor screen may appear to be delayed by one frame.	Default is bottom center of screen. Use the arrow direction keys to adjust the indication position while watching the monitor. Press the MENU button to confirm the setting and return to the level 1 menu.
CHARA. TYPE **(> Chara type)** Type of characters in text superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor	* WHITE (WITH BKGD) (>> White): White characters on black background BLACK (WITH BKGD) (>> Black): Black characters on white background WHITE (OUTLINE) (>> W/outline): White characters with black outline BLACK (OUTLINE) (>> B/outline): Black characters with white outline Press the MENU button to confirm the setting and return to the level 1 menu.
DISPLAY INFO **(> DISP info)** Information superimposed on output from VIDEO 2 (SUPER) OUTPUT connector to monitor Note When the TIME DATA & UB or TIME DATA & CTL setting is selected, the lower time data may appear to be delayed by one frame from the upper value.	* TIME DATA & STATUS (>> Time & STA): Time data and operating status TIME DATA & UB (>> Time & UB): Time data selected using the CTL/LTC/U-BIT switch and user's bit value (when user's bit is selected with the CTL/LTC/U-BIT switch, user's bit and LTC value) TIME DATA & CTL (>> Time & CTL): Time data selected using the CTL/LTC/U-BIT switch and CTL value (when CTL is selected with the CTL/LTC/U-BIT switch, CTL and user's bit value) TIME DATA (>> Time): Time data only
PEAK HOLD **(> Peak hold)** Peak hold time for audio level meters	Set the time from zero (OFF) to 1.5 seconds in steps of 0.1 second. 1.5 SEC (>> 1.5 sec) – * OFF (>> OFF)
BRIGHTNESS **(> Brightness)** Brightness of front panel indicators	Set brightness as a percentage of the maximum. * 100% (>> 100%) 66% (>> 66%) 33% (>> 33%)
ALARM **(> ALARM)** Determine whether alarms are issued or not.	* ON (>> ON): Alarms are issued. OFF (>> OFF): Alarms are not issued.
REF ALARM (> REF ALARM) Determine whether alarms related to reference video signal are issued or not.	ON (>> ON): Alarms are issued. * ON (LIMITED) (>> ON (Limit)): Alarms are issued in recording and EE mode. OFF (>> OFF): Alarms are not issued.

(Continued)

Menu selections (continued)

TIME CODE: Settings related to the time code (Time code) generator	Description of settings
RUN MODE **(> RUN mode)** Run mode of the time code generator.	* FREE RUN (>> FREE RUN): Time code generator keeps running. REC RUN (>> REC RUN): Time code generator only runs while recording.
DF MODE (only on UVW-1400A) **(> DF mode)** Select whether the time code generator and CTL counter operate in drop-frame or non-drop-frame mode. Normally select drop-frame mode, to keep in sync with real time. The non-drop-frame mode is useful for example when using computer graphics, and working on a frame count basis.	* ON (DF) (>> ON DF): Drop-frame mode OFF (NDF) (>> OFF NDF): Non-drop-frame mode
UB BINARY GP. (> Binary Gp.) (for UVW-1400A) Select the user's bit binary group flag of the time code generator.	* 000 (>> 000): Character set not specified 001 (>> 001): 8-bit characters conforming to ISO646 and ISO2022 010 (>> 010): Undefined 011 (>> 011): Undefined 100 (>> 100): Multi-cassette 101 (>> 101): Multiplex 110 (>> 110): Alternate 111 (>> 111): Undefined
UB BINARY GP. (> Binary Gp.) (for UVW-1400AP)	* 00 (>> 00): Not specified 01 (>> 01): ISO character 10 (>> 10): Unassigned-1 11 (>> 11): Unassigned-2
PHASE CORR. (> Phase corr) Time code generator phase correction	* OFF (>> OFF): Phase is not corrected. ON (>> ON): Phase is corrected.
CF FLAG (> CF flag) Set color framing flag on or off in a unused bit of time code data Note This setting relates only to the control of the CF flag bit in the internal time code generator of this unit. It has no effect on normal color framing.	* OFF (>> OFF): Set color framing flag off. ON (>> ON): Set color framing flag on.

Menu selections (continued)

TAPE PROTECTION: (Tape protct)	Settings related to tape protection	Description of settings
FROM STOP (> From STOP) Protected mode and time to switch from stop mode for protection of the tape and head drum	STOP TIMER (>> STP Timer) Time to switch to protected mode from stop mode	Select time from 15 settings from 0.5 seconds to 30 minutes. 30 MIN (>>> 30 min) – * 8 MIN (>>> 8 min) – 0.5 SEC (>>> 0.5 sec)
	NEXT MODE (>> Next mode) Tape protection mode when time set in STOP TIMER setting elapses **Note** When this unit is in tension release mode, the drum is still rotating, so the picture can be monitored. In tension release mode, though the unit is also in "standby on" mode (i.e. is on standby), so if the distinction between "standby on" and "standby off" is important (for example when broadcasting), care should be taken over the setting.	* STANDBY OFF (>>> STANDBY): Standby off mode TENSION RELEASE (>>> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.
FROM STILL (> From STILL) Protected mode and time to switch from search mode still or pause for protection of the tape and head drum	STILL TIMER (>> STL timer) Time to switch to protected mode from search mode still or pause	Select time from 15 settings from 0.5 seconds to 30 minutes. 30 MIN (>>> 30 min) – * 8 MIN (>>> 8 min) – 0.5 SEC (>>> 0.5 sec)
	NEXT MODE (>> Next mode) Tape protection mode when time set in STILL TIMER setting elapses **Note** When this unit is in tension release mode, the drum is still rotating, so the picture can be monitored. For both the STEP FWD and TENSION RELEASE settings, the unit is also in "standby on" mode (i.e. is on standby), so if the distinction between "standby on" and "standby off" is important (for example when broadcasting), care should be taken over the setting.	* STEP FWD (>>> Step): The tape is advanced at x$^{1}/_{30}$ speed for 2 seconds. STANDBY OFF (>>> STANDBY): Standby off mode TENSION RELEASE (>>> T. RLSE): The tape tension is released, but the picture can still be seen on the monitor.

(Continued)

Menu Organization

Menu selections (continued)

VIDEO CONTROL: Settings related to video (Video) control	Description of settings	
TBS DELAY (> TBS delay) Time base stabilizer delay in video EE mode **Note** When used for broadcasting, select VIDEO DELAY.	* SYNC DELAY (>> Sync): The synchronization signal included in the output video signal is delayed from the reference signal by the operating time of the TBS, and output synchronized to the video signal. VIDEO DELAY (>> Video): The synchronization signal included in the output video signal is synchronized to the reference signal, and only the video signal output is delayed.	
SYNC ON GREEN (> Sync Green) Select whether or not to add a sync signal to the green signal of the RGB output signal.	* ON (>> ON): Add a sync signal. OFF (>> OFF): Do not add a sync signal.	
BLANKING LINE (> BLK line) Determine whether or not to output video signals during blanking. Settings can be made for each of the lines between line 12 and 20 for UVW-1400A, and between line 9 and 23 for UVW-1400AP.	UVW-1400A: 12 LINE (>> 12 line) –20 LINE (>> 20 line) UVW-1400AP: 9 LINE (>> 09 line) –23 LINE (>> 23 line)	* MASK(>>> Mask): Video signal is not output. HALF(>>> Half): Only a half of video signal (only for line 20 on UVW-1400A, and only for line 23 on UVW-1400AP) is output. OUTPUT(>>> Output): Video signal is output.
BLANKING DECODE (> BLK decode) Determine a method of separating input composite video signals into a luminance signal and chrominance signal during blanking. Settings can be made for each of the lines between line 12 and 19 for UVW-1400A, and between line 9 and 22 for UVW-1400AP.	UVW-1400A: 12 LINE (>> 12 line) –19 LINE (>> 19 line) UVW-1400AP: 9 LINE (>> 09 line) –22 LINE (>> 22 line)	* BLACK & WHITE (>>> B&W): Input signals are processed as black and white signals. BPF(>>> BPF): Input signals are processed with a band-pass filter.

Menu selections (continued)

INTERFACE CONTROL: Remote interface setting (Interface)	**Description of settings**
RS-232C BPS (> RS232C bps) Set the baud rate for communications with equipment connected to the REMOTE connector on the rear panel.	38400 BPS (>> 38400 bps) 19200 BPS (>> 19200 bps) * 9600 BPS (>> 9600 bps) 4800 BPS (>> 4800 bps) 2400 BPS (>> 2400 bps) 1200 BPS (>> 1200 bps)
FOOT SWITCH (> Foot SW) Select the foot switch type.	OFF (>> OFF): Foot switch is not used. * DOWN EDGE TRIGGER (>> Down Edge): Falling edge trigger type. (Switch pressed once to start recording and again to pause; pressing switch produces a falling edge.) UP EDGE TRIGGER (>> Up Edge): Rising edge trigger type. (Switch pressed once to start recording and again to pause; pressing switch produces a rising edge.) LOW LEVEL TRIGGER (>> Low Level): Low level trigger type. (Switch pressed to start recording and released to pause.)
VIDEO PRINTER (> Printer) Set the timing for trigger output to a video printer.	16 FIELD DELAY (>> 16 Field): Start trigger output 16 fields before the frame to be output. 15 FIELD DELAY (>> 15 Field): Start trigger output 15 fields before the frame to be output. 14 FIELD DELAY (>> 14 Field): Start trigger output 14 fields before the frame to be output. ⋮ * 4 FIELD DELAY (>> 4 Field): Start trigger output 4 fields before the frame to be output. 3 FIELD DELAY (>> 3 Field): Start trigger output 3 fields before the frame to be output. 2 FIELD DELAY (>> 2 Field): Start trigger output 2 fields before the frame to be output. 1 FIELD DELAY (>> 1 Field): Start trigger output 1 field before the frame to be output.

MENU GRADE: Menu screen selection (Menu grade)	**Description of settings**
—	* BASIC (> Basic): Display basic menu screens. ENHANCED (> Enhanced): Display extended menu screens.

Menu Operations

Although the menu screens are divided into basic and extended categories, the method of operation is the same.

This section describes as an example the procedure required to change the setting for the tape protection mode used when the deck is stopped. Check the location of this setting in the menu tree, by referring to the previous section; it is in the level 2 menu screen "TAPE PROTECTION", which is an extended menu screen.

Buttons Used to Change the Setting

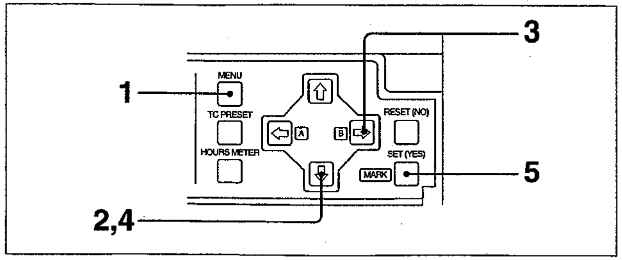
This operation uses the following buttons on the subsidiary control panel.

Buttons used to change the menu setting and their functions

MENU button	• Entering menu mode • Leaving menu mode
⇧ ⇩ buttons	Moving the reverse video cursor up and down to change the selection within a menu screen; if held down, the reverse video cursor continues to move.
⇦ (A) ⇨ (B) buttons	• The ⇦ (A) button moves to the menu at the next higher level. • The ⇨ (B) button moves to the menu at the next lower level. If either button is held down, the reverse video cursor continues to move.
RESET (NO) button	• Returns a setting to its factory default. • Answers 'no' to a question on the monitor screen.
SET (YES) (MARK) button	• Confirms a changed setting. • Answers 'yes' to a question on the monitor screen.

Operation Sequence

Displaying the extended menus

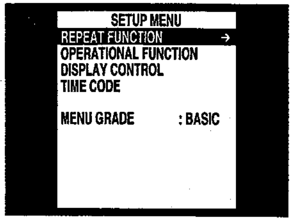


Displaying the extended menus

1 Press the MENU button.

The level 1 menu appears on the monitor screen. The factory default setting is basic menu screens only.
The reverse video cursor shows the current selection; in the figure below, this is "OPERATIONAL FUNCTION." The → mark indicates this item has an associated submenu.
The time counter display shows the selected item only, often in abbreviated form.

Level 1 menu display (basic menu screen)



SETUP MENU
REPEAT FUNCTION →
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE

MENU GRADE :BASIC

Monitor screen

REPEAT FUNC

Time counter display

The "MENU GRADE" setting has no associated submenus. In such a case, the current setting also appears in abbreviated form to the right of the screen. When the factory default setting is currently selected, the ":" indication precedes that setting. In this case the setting does not appear on the time counter display.

(Continued)

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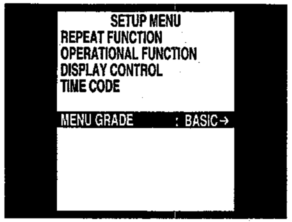
2 Press the ⇩ button to select "MENU GRADE :BASIC".

Selecting MENU GRADE :BASIC



SETUP MENU
REPEAT FUNCTION
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE

MENU GRADE : BASIC→

Monitor screen

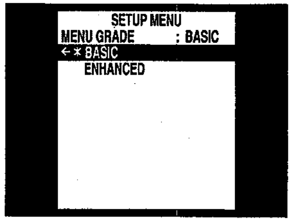
Menu grade

Time counter display

3 Press the ⇨ (B) button.

This displays all of the settings, and the current selection appears on the monitor screen in reverse video. The ← mark indicates the "BASIC" has an assoicated menu at the next higher level. The "*" indication precedes the factory default setting.

Displaying the settings



SETUP MENU
MENU GRADE : BASIC
← * BASIC
ENHANCED

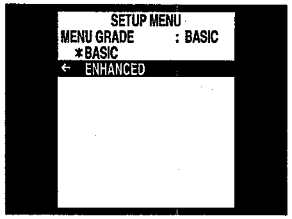
Monitor screen

> Basic

Time counter display

4 Press the ⇩ button to select "ENHANCED".

Selecting ENHANCED



SETUP MENU
MENU GRADE : BASIC
*BASIC
← ENHANCED

Monitor screen

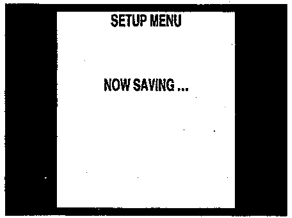
> Enhanced

Time counter display

5 Press the SET (YES) (MARK) button.

The messages shown below appear in the monitor screen and the time counter display, and the new setting is saved in memory.

Messages when saving settings



SETUP MENU

NOW SAVING ...

Monitor screen

Saving...

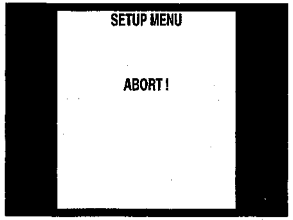
Time counter display

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) (MARK) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) (MARK) button after finishing all the desired settings.

Forcibly aborting the menus



SETUP MENU

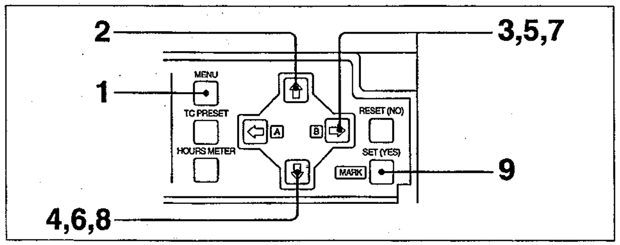
ABORT !

Monitor screen

Abort !

Time counter display

Changing the “NEXT MODE” setting



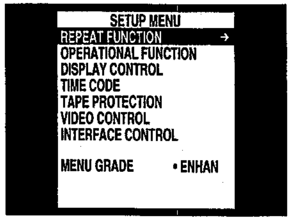
Changing the NEXT MODE setting

1 Press the MENU button.

The level 1 extended menu appears on the monitor screen.

When the currently selected setting is not the factory default setting, the “•” indication instead of the “:” indication precedes that setting.

Level 1 menu display (extended menu screen)



```
SETUP MENU
REPEAT FUNCTION            →
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE
TAPE PROTECTION
VIDEO CONTROL
INTERFACE CONTROL

MENU GRADE        •ENHAN
```

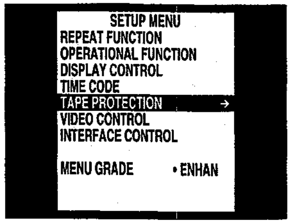
Monitor screen

REPEAT FUNC

Time counter display

2 Press the ⊡ button to select “TAPE PROTECTION”.

Selecting TAPE PROTECTION



```
SETUP MENU
REPEAT FUNCTION
OPERATIONAL FUNCTION
DISPLAY CONTROL
TIME CODE
TAPE PROTECTION            →
VIDEO CONTROL
INTERFACE CONTROL

MENU GRADE        •ENHAN
```

Monitor screen

Tape protct

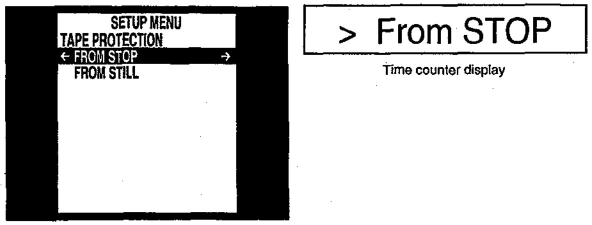
Time counter display

3 Press the ⊟ (B) button.

The level 2 menu screen appears.

When this menu appears for the first time, "FROM STOP" is selected.

Level 2 menu screen (TAPE PROTECTION)

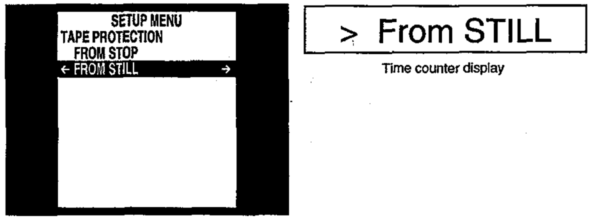

SETUP MENU
TAPE PROTECTION
← FROM STOP →
FROM STILL
> From STOP

Monitor screen

Time counter display

4 Press the ⊞ button to select "FROM STILL".

Selecting FROM STILL


SETUP MENU
TAPE PROTECTION
FROM STOP
← FROM STILL →
> From STILL

Monitor screen

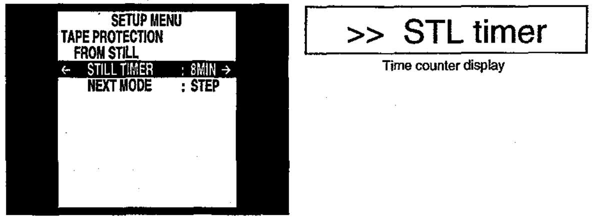
Time counter display

5 Press the ⊟ (B) button.

The level 3 menu screen appears.

When this menu appears for the first time, "STILL TIMER" is selected.

Level 3 menu screen (FROM STILL)


SETUP MENU
TAPE PROTECTION
FROM STILL
← STILL TIMER : 8MIN →
NEXT MODE : STEP
>> STL timer

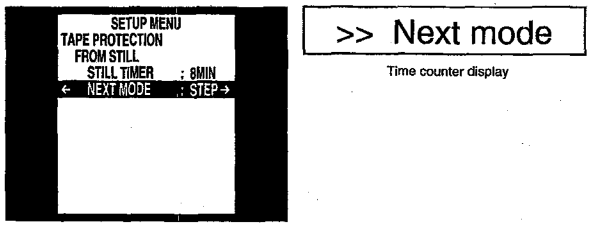
Monitor screen

Time counter display

(Continued)

6 Press the ⊞ button to select "NEXT MODE".

Selecting NEXT MODE


SETUP MENU
TAPE PROTECTION
FROM STILL
STILL TIMER : 8MIN
← NEXT MODE : STEP →
>> Next mode

Monitor screen

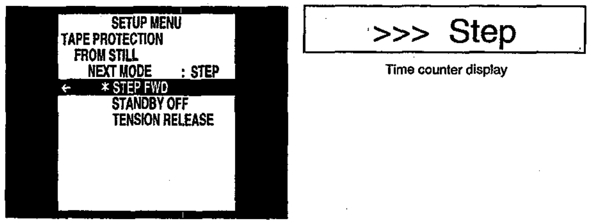
Time counter display

7 Press the ⊟ (B) button.

The settings for "NEXT MODE" appear.

When this menu screen appears for the first time, "STEP FWD" is selected.

Setting screen display

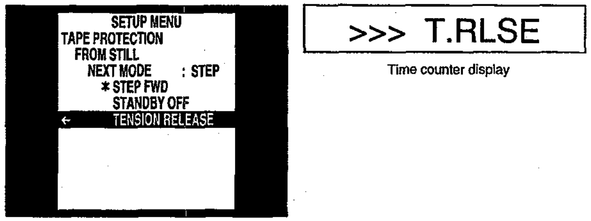

SETUP MENU
TAPE PROTECTION
FROM STILL
NEXT MODE : STEP
← ∗ STEP FWD
STANDBY OFF
TENSION RELEASE
>>> Step

Monitor screen

Time counter display

8 Press the ⊞ button to select "TENSION RELEASE".

Selecting TENSION RELEASE


SETUP MENU
TAPE PROTECTION
FROM STILL
NEXT MODE : STEP
∗ STEP FWD
STANDBY OFF
← TENSION RELEASE
>>> T.RLSE

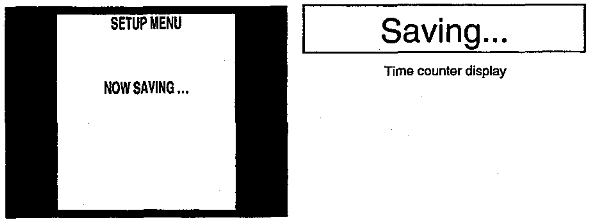
Monitor screen

Time counter display

9 Press the SET (YES) (MARK) button.

The “Saving” message appears on the monitor (as shown below), and the new setting is saved in memory.

Messages when saving settings



SETUP MENU

NOW SAVING...

Saving...

Monitor screen

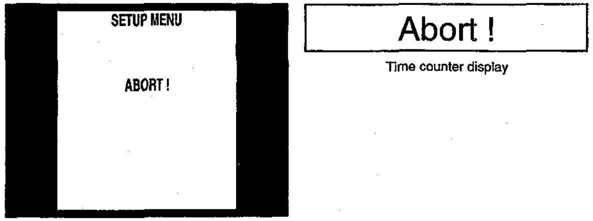
Time counter display

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) (MARK) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the menu system is forcibly exited. If making more than one setting, be sure to press the SET (YES) (MARK) button before moving to the next item.

Forcibly aborting the menus



SETUP MENU

ABORT !

Abort !

Monitor screen

Time counter display

Returning menu settings to the factory default

Returning a specific menu setting to its factory default

In the screen for making the setting, press the RESET (NO) button.

In the example above of the “NEXT MODE” setting, press the RESET (NO) button in step **8** to return to the factory default of “STANDBY OFF”.

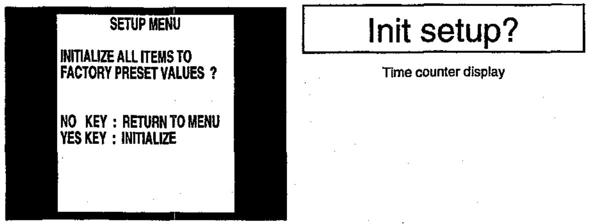
Returning all menu settings to the factory default

1 Press the MENU button to display the level 1 menu.

2 Press the RESET (NO) button.

The following message appears on the monitor screen, which is intended to ask the user to confirm the reinitialization.

Request for confirmation of reinitialization



SETUP MENU

INITIALIZE ALL ITEMS TO
FACTORY PRESET VALUES ?

NO KEY : RETURN TO MENU
YES KEY : INITIALIZE

Init setup?

Monitor screen

Time counter display

3 Press the SET (YES) (MARK) button.

This returns all menu settings to their factory defaults. The “Saving” message appears on the monitor, and the new setting is saved in memory.

Notes

- If you power off this unit while it is in the process of saving the settings, the reinitialization can not be ensured. Wait until saving is completed before powering the unit off.
- If instead of pressing the SET (YES) (MARK) button, you press the RESET (NO) button, the reinitialization is not carried out, and the display returns to the level 1 menu screen.

Chapter 7
Maintenance

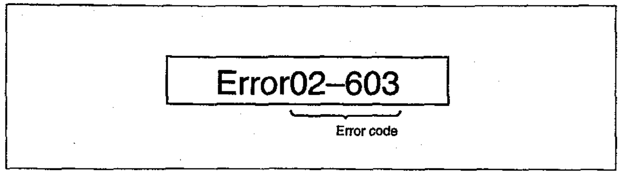
This chapter describes the self-diagnosis function with which this unit is provided, the action to be taken in the event of condensation on the head drum, the digital hours meter, and the head-cleaning process needed to ensure high video and audio reproduction quality.

Self-Diagnostics .... 7-2 (E)
Condensation .... 7-3 (E)
Regular Checks .... 7-4 (E)
  Digital Hours Meter .... 7-4 (E)
  Head Cleaning .... 7-5 (E)

Self-Diagnostics

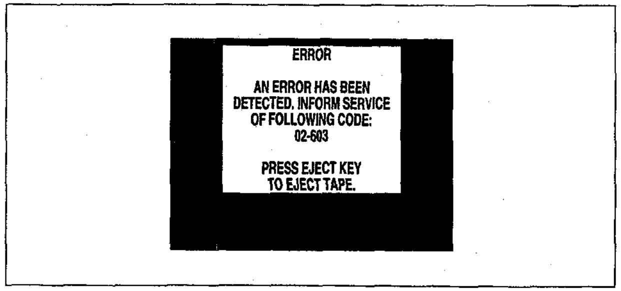
This unit is provided with a self-diagnosis function which detects internal faults. If a fault is detected, this unit displays an error code in the time counter display and an error message on the monitor screen.

To display error messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the subsidiary control panel must be in the ON position.



Error02–603

Example error code displayed on the time counter display



ERROR

AN ERROR HAS BEEN
DETECTED. INFORM SERVICE
OF FOLLOWING CODE:
02-603

PRESS EJECT KEY
TO EJECT TAPE.

Monitor screen error message

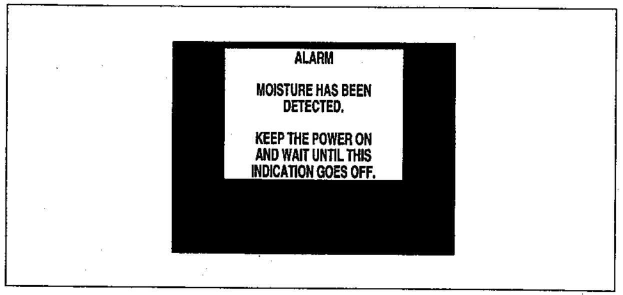
When an error message appears on the monitor screen, follow the direction displayed.

Condensation

If the unit is suddenly moved from a cold to a warm location, or used in a very humid place, moisture from the air can condense on the head-drum. If the tape is run in this state, the tape may stick to the drum, in which case **it is highly likely to be damaged.** To lessen the risk of this occurring, this unit is fitted with a condensation detection system.

If moisture condenses on the head-drum while the unit is operating

The indication "HUMID !" appears in the time counter display. The following indication also appears on the monitor.



ALARM

MOISTURE HAS BEEN DETECTED.

KEEP THE POWER ON AND WAIT UNTIL THIS INDICATION GOES OFF.

Condensation warning indication

If this happens, the cassette is ejected automatically.
Before resuming the operation, wait until the alarm message disappears, without turning the unit off.

If the condensation warning appears immediately after powering on

Leave the unit powered on and wait until the indication disappears. While the indication is present, it is not possible to insert a cassette.
Once the warning indication disappears, the unit is ready for use.

Regular Checks

Digital Hours Meter

The digital hours meter keeps a cumulative count of the total operating time, the drum rotation time, the tape transport operating time, and the number of threading and unthreading operations. These counts can be displayed on the monitor and time counter display; use them as guidelines for scheduling maintenance. Consult your Sony service representative about necessary periodic maintenance checks.

Digital hours meter indications

The digital hours meter provides the following four display items.

T1: OPERATION
Cumulative total of hours unit is powered on, **in units of 10 hours**

T2: DRUM ROTATION
Cumulative total of hours of drum rotation with tape threaded, **in units of 10 hours**

T3: TAPE RUNNING
Cumulative total of hours of tape transport operation, **in units of 10 hours**

CT: THREADING
Cumulative number of tape threading/unthreading operation pairs, **in units of 10 operation pairs**

Except for the total operation time, there are two counts for each item: the cumulative total from manufacture, and a 'trip' count resettable.

Displaying the digital hours meter

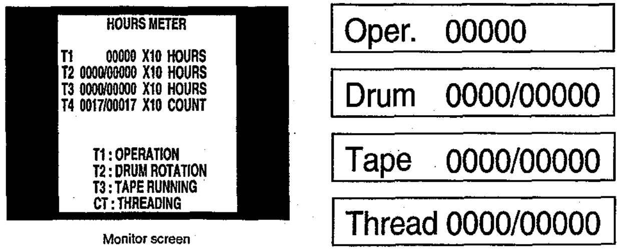
Press the HOURS METER button.

Monitor display
All four counts appear.
The four-digit value to the left of the slash is the resettable trip count, and the right value is the cumulative total from manufacture.

Time counter display
One of the four indications appears. Use the ↑ and ↓ buttons to change the item displayed.

Initially, only the trip value appears. Press the → (B) button to display the cumulative total to the right of the slash, as long as the button is held down.

Digital hours meter



```
HOURS METER

T1      00000 X10 HOURS
T2 0000/00000 X10 HOURS
T3 0000/00000 X10 HOURS
T4 0017/00017 X10 COUNT

    T1 : OPERATION
    T2 : DRUM ROTATION
    T3 : TAPE RUNNING
    CT : THREADING
```

Monitor screen

```
Oper.  00000
Drum   0000/00000
Tape   0000/00000
Thread 0000/00000
```

Time counter display

Ending the digital hours meter display
Press the HOURS METER button.

Resetting the trip values
Consult your Sony service representative.

Head Cleaning

Clean both the video and audio heads using the special BCT-5CLN cleaning cassette. Follow the instructions for the cleaning cassette carefully, as improper use can damage the heads.

Cleaning procedure
Insert the cleaning cassette, hold down the PLAY button and press the EJECT button. This carries out a five-second cleaning operation. The EJECT indicator flashes during this period, and all tape transport buttons other than the EJECT button are disabled.

Notes

- Up to three consecutive five-second cleaning operations are possible. Cleaning above this level may damage the heads.
- Be sure the unit is not left with the cleaning cassette in place, as this can cause damage to the heads.

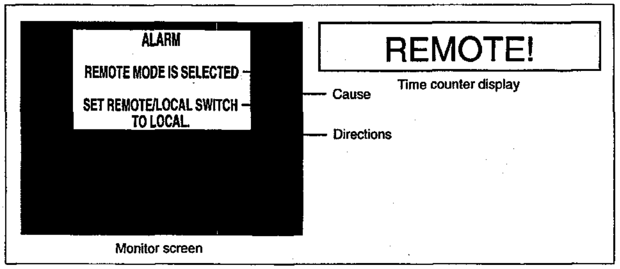
Chapter 8
Operational Problems

If an alarm message appears on the screen, or the unit appears to be malfunctioning, check this chapter before consulting your Sony service representative.

Alarm Messages .... 8-2 (E)
Troubleshooting Guide .... 8-4 (E)

Alarm Messages

There are a number of messages which may appear on the monitor screen during operation. (A message also appears in the time counter display.)


ALARM
REMOTE MODE IS SELECTED
SET REMOTE/LOCAL SWITCH TO LOCAL
Monitor screen
Cause
Directions
REMOTE!
Time counter display

Alarm messages

These alarm messages indicate misoperations or problems with the unit such as condensation on the drum.

To display these messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the subsidiary control panel must be in the ON position. It is possible to disable the display of warning indications in the menu system, by setting the ALARM and REF. ALARM items to OFF.

For details of the menu settings see the section "Menu Operations" (page 6-10(E)).

If an alarm message is indicated, take appropriate action according to its contents.

The alarm messages indications are listed below.

Alarm messages

Alarm messages on the monitor screen		Alarm messages in the time counter display
Cause	Direction	
ABNORMAL SETTINGS SELECTED IN SETUP MENU.	SET ITEMS IN THE SETUP MENU TO THE APPROPRIATE VALUES. CONTACT YOUR DEALER IF THIS ALARM APPEARS AGAIN DESPITE THE ABOVE PROCEDURE.	Irr. SETUP !
MOISTURE HAS BEEN DETECTED.	KEEP THE POWER ON AND WAIT UNTIL THIS INDICATION GOES OFF.	HUMID !
REMOTE MODE IS SELECTED.	SET REMOTE/LOCAL SWITCH TO LOCAL.	REMOTE !
KEY IS JAMMED. CHECK THE FOLLOWING KEYS: (EJECT) (STOP) (F. FWD) (REW) (PLAY) (REC) (UP) (DOWN) (RIGHT) (LEFT) (SET) (H. M.) (TC SET) (MENU) (RESET)		Key short !
NO CASSETTE IN VTR.	—	No Casse !
RECORD INHIBIT PLUG ON THE CASSETTE IS SET TO INHIBIT.	—	REC INH.!
CTL MODE IS SELECTED.	SET CTL/TC/UB SWITCH TO TC OR UB.	CTL mode !
REC-PAUSE MODE IS SELECTED.	TC/UB PRESET IS IMPOSSIBLE IN REC-PAUSE MODE.	REC-PAUSE !
REF VIDEO IS NOT DETECTED.	INPUT A REF VIDEO SIGNAL.	No REF !
A BLACK/WHITE SIGNAL IS BEING USED FOR REF VIDEO.	SUPPLY A COLOR SIGNAL WHEN USING THE COMPOSITE OUT OR S-VIDEO OUT.	B&W REF !
A NON-STANDARD SIGNAL IS BEING USED FOR REF VIDEO.	USE A STANDARD SIGNAL.	REF NON-STD
INPUT VIDEO IS NOT DETECTED.	CHECK THE VIDEO IN SWITCH AND SUPPLY A VIDEO SIGNAL TO VIDEO INPUT.	No INPUT !
VIDEO PRINTER IS NOT CONNECTED.	—	No Printer !
FOOT SWITCH CANNOT BE USED.	SET THE MENU OF 'FOOT SWITCH' TO OTHER VALUE	Foot SW OFF

Troubleshooting Guide

Tape problems		
Symptom	Cause	Remedy
Recording is not possible.	The record-inhibit plug on the cassette is pressed in [a].	Pull out the plug, or use a different tape.
The tape transport controls (PLAY, F FWD, REW buttons etc.) do not operate.	The REMOTE/LOCAL switch is in the REMOTE position, and the LOCAL ENABLE menu setting is "STOP & EJECT" or "ALL DISABLE" [a].	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL ENABLE".
	No cassette is loaded [a].	Insert a cassette.
Pressing the PLAY button does not enter playback mode.	The unit is in REPEAT mode.	Set the REPEAT MODE menu item to OFF. When REPEAT MODE is set to ON, pressing the PLAY button cues up the repeat start point instead of entering playback mode.

Audio problems		
Symptom	Cause	Remedy
It is not possible to disable the Dolby noise reduction.	—	On this unit, it is not possible to disable the Dolby noise reduction.

Time code problems		
Symptom	Cause	Remedy
It is not possible to preset the time counter display to an arbitrary value.	The CTL/LTC/U-BIT switch is in the CTL position.	Set the CTL/LTC/U-BIT switch to the LTC or U-BIT position. (It is not possible to preset time counter values.)
	The REMOTE/LOCAL switch is in the REMOTE position, and the LOCAL ENABLE menu setting is "STOP & EJECT" or "ALL DISABLE" [a].	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL ENABLE".
Although the tape transport is operating, the time counter value does not change.	The MENU button, TC PRESET button or HOURS METER button has been pressed.	Press the button again, to exit from menu setting mode, time code presetting mode or hours meter mode, as the case may be. (In either of these modes, the time counter display does not show time counter information.)
	The time counter display is showing user's bit data.	Set the CTL/LTC/U-BIT switch to the LTC or CTL position.

a) In these states an alarm message appears both on the monitor screen and time counter display.

Monitor problems

Symptom	Cause	Remedy
A "V" [a]appears on the screen.	The TBS DELAY menu item is set to "VIDEO DELAY".	Set TBS DELAY to "SYNC DELAY". (The UVW-series has a built-in time base stabilizer. Therefore, in recording mode or video EE mode, the output video signal is delayed exactly 8 lines behind the reference signal. This means that when the TBS DELAY setting is "VIDEO DELAY", the video appears 8 lines lower on the monitor, and a "V" appears. However, even if the TBS DELAY item is set to "SYNC DELAY", if the monitor is synchronized to an external reference, a "V" also appears. This is not a malfunction.)
	A reference video signal is not being input. Alternatively, the input video signal is not synchronized to the reference signal [b].	Input a reference signal which is synchronized to the input video signal. Alternatively, use the REF. VIDEO INPUT connector on this unit in loop-through mode, and connect to the player REF. VIDEO INPUT. (In recording mode, the servo synchronizes to the input video signal. Therefore, if the input video signal and reference video signal are not synchronized, the time base stabilizer and servo will not synchronize, and therefore the picture will break up. Recording in this condition, however, will not affect the quality of the recording.)
The time code (or other time counter indication) superimposed on the monitor is one frame behind.	The time code is being displayed in the top third of the screen.	Move the display position down. (When using a superimposed time code, and recording on another VTR avoid the top third of the screen. In the UVW-series, the time code is superimposed as soon as read, and therefore even discontinuous time information such as user's bit data can be displayed with the minimum of delay. However, since the new data value is still being processed while the beam is scanning the top third of the screen, the data from the previous frame appears if the time code is diaplayed within this area.)
The picture does not appear in video EE mode.	The connector to which the video signal is input does not match the settings of the VIDEO IN selector switches.[b]	Make the settings of the VIDEO IN selector switches match the connector to which the video signal is input.
No superimposed information appears on the monitor screen.	The CHARACTER switch is in the OFF position.	Set the CHARACTER switch to the ON position.
	The monitor is not connected to the VIDEO 2 (SUPER) OUTPUT connector.	Connect the monitor to the VIDEO 2 (SUPER) OUTPUT connector. (To display superimposed information, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector.)
The monitor screen is too bright.	The monitor INPUT connector 75 termination switch is in the OFF position, or there is no terminating device.	Set the monitor INPUT connector 75 termination switch to the ON position, or connect a terminating device.
The monitor screen is too dark.	When using the monitor INPUT connectors of two or more monitors for a loop-through connection, more than one 75 termination switch is set to the ON position.	Set the 75 termination switch of the monitor INPUT connector being used for a loop-through connection to the OFF position.
The video image is too dark when recording a composite video signal.		

a) V-blanking *(see page A-7(E))*
b) In this state an alarm message appears on the monitor screen and time counter display.

Appendixes

Specifications .... A-2 (E)
Glossary .... A-5 (E)

Specifications

General

Power requirements	UVW-1400A: 100 to 120 V AC, 50/60 Hz UVW-1400AP: 200 to 240 V AC, 50/60 Hz
Power consumption	85 W
Operating temperature	+5°C to +40°C (+41°F to +104°F)
Storage temperature	–20°C to +60°C (–4°F to +140°F)
Humidity	Less than 80%
Mass	19 kg (41 lb 12 oz)
External dimensions	427 mm (W) × 193 mm (H) × 474 mm (D) ($16\,^3/_4$" × $7\,^5/_8$" × $18\,^5/_8$"), excluding external projections

Tape transport system

Tape speed	UVW-1400A: 118.6 mm/s UVW-1400AP: 101.5 mm/s
Maximum recording/playback time	UVW-1400A: 90 minutes or longer (for BCT-90MLA) UVW-1400AP: 100 minutes or longer (for BCT-90MLA)
Fast forward/rewind time	180 s or less (for BCT-90MLA)
Recommended cassettes	Betacam SP $^1/_2$-inch cassette Metal tapes: BCT-5MA/10MA/20MA/30MA, UVWT-10MA/20MA/30MA BCT-5MLA/10MLA/20MLA/30MLA/60MLA/90MLA, UVWT-60MLA/90MLA or equivalent

Video system

Recording method	Luminance: frequency modulation Chrominance: Time division/time compression chrominance frequency modulation

			Metal tape
Bandwidth	Luminance		NTSC: 30 Hz to 4 MHz +1.0 dB/–4.0 dB PAL: 25 Hz to 5 MHz +1.0 dB/–4.0 dB
	Color difference (R–Y/B–Y)		NTSC: 30 Hz to 1.5 MHz +1.0 dB/–4.0 dB PAL: 25 Hz to 1.5 MHz +1.0 dB/–4.0 dB
S/N ratio	Luminance (component IN/OUT)		NTSC: 49 dB or more, PAL: 46 dB or more
	Chrominance	Amplitude modulation	NTSC: 52 dB or more, PAL: 48 dB or more
		Phase modulation	NTSC: 52 dB or more, PAL: 48 dB or more
K factor (2T pulse)			3% or less
Y/C delay			30 ns or less

Audio System

Recording method Bias

Metal tape	
Frequency characteristics	50 Hz to 15 kHz +2.0 dB/–3.0 dB
S/N ratio (at 3% distortion level for NTSC) (Referred to peak level [a]) Weighted CCIR 468-3 for PAL)	NTSC: 70 dB or more PAL: 66 dB or more
Distortion (THD) (at 1 kHz reference level)	1.5% or less
Wow and flutter	0.15% rms or less

a) Peak level= +8 dB above operational level

Input connectors

Video input

REF. VIDEO	BNC × 2 (loop-through connection) Composite video: 1.0 Vp-p ±0.3 V, 75 Ω, sync negative (286 mV for UVW-1400A, 300 mV for UVW-1400AP) Composite sync: 0.2 to 5.0 Vp-p, 75 Ω, negative (when using component signals)
VIDEO	BNC × 2 (loop-through connection) Composite video: 1.0 Vp-p, 75 Ω, sync negative
RGB/COMPONENT	BNC × 3 G plus sync/Y: 1.0 Vp-p, 75 Ω, sync negative or G: 0.7 Vp-p, 75 Ω R/R–Y: 0.7 Vp-p, 75 Ω B/B–Y: 0.7 Vp-p, 75 Ω
S-VIDEO	DIN 4-pin × 1

Audio input

AUDIO CH-1/2	XLR 3-pin × 2 (female) ON: +4 dBu, 600 Ω, balanced OFF: +4 dBu, 10 kΩ, balanced (0 dBu = 0.775 Vrms)

Specifications

Output connectors

Video output

VIDEO 1/2 (SUPER)	BNC × 2 Composite video, 1.0 Vp-p, 75 Ω, sync negative (286 mV for UVW-1400A, 300 mV for UVW-1400AP) Switch selection on the subsidiary control panel controls whether time codes and other superimposed information are output from VIDEO 2 (SUPER) OUTPUT.
RGB/COMPONENT	BNC × 3 G plus sync/Y: 1.0 Vp-p, 75 Ω, sync negative or G: 0.7 Vp-p, 75 Ω R/R–Y: 0.7 Vp-p, 75 Ω B/B–Y: 0.7 Vp-p, 75 Ω
RGB SYNC	BNC × 1 Composite sync (no burst): 2.0 Vp-p, 75 Ω, negative
S-VIDEO	DIN 4-pin × 1

Audio output

AUDIO CH-1/2	XLR 3-pin × 2 (male) +4 dBu (600 Ω load), low impedance, balanced
MONITOR AUDIO	RCA phono jack × 1
HEADPHONES	Stereo phone jack Maximum –14 dBu, 8 Ω (0 dBu = 0.775 Vrms)

Remote connectors

REMOTE: 25-pin multi × 1
REMOTE OUT: Stereo mini-jack × 1
REMOTE 2: Stereo mini-jack × 1
CONTROL S: Stereo mini-jack × 1

Supplied accessories

AC power cord (1)
Operating Instructions (1)

Optional accessories

RMM-130 Rack Mount Adaptor
BCT-5CLN Cleaning Cassette
SVRM-100/100A Remote Control Unit

Design and specifications are subject to change without notice.

Glossary

A/B roll edit
An edit in which two or more players are used to create special effects such as dissolve and wipe, and one recorder is used to record the results of the edit. Using an editing controller allows efficient control of the VTRs and very precise editing.

B–Y signal
A chrominance signal determined by subtracting the Y (luminance) signal from the B (blue) signal. One of the component signals.

Bridging connection
A connection which allows a signal input to an input terminal to pass through the unit and exit from an output terminal as input to external equipment. Also called loop-through connection.

Capstan
A drive mechanism that moves the tape at a specified speed. Its rotation normally synchronizes with a reference sync signal.

Chrominance signal
Color signal containing color information such as hue and saturation. Also called C signal.

Color frame
The color subcarrier phase, whose one cycle consists of two frames (four fields) in NTSC format and four frames (eight fields) in PAL format.

Color framing
Maintenance of continuity in the color subcarrier phase between one frame and the next, for the purpose of avoiding noise on the picture.

Component video signal
A video signal consisting of a luminance signal (Y) and two chrominance signals (R–Y, B–Y).

Composite video signal
A composite video signal containing video, burst and sync signals.

CTL
Abbreviation of control signal. A pulse signal recorded on a longitudinal track of the tape in units of fields. Counting this signal allows the number of frames to be used to display the tape running time. It is also used as a control signal to adjust the relationship between the scanning position of the video heads and tape movement during playback to match that during recording.

Drop frame mode
In NTSC format, the actual number of frames per second is approximately 29.97, while that for the time code is specified as 30. Drop frame mode is a mode in which the time code is advanced in such a way that the difference in frame value between real time and the time codes is corrected. In this mode, two frames are skipped at the beginning of each minute, except for every tenth minute, so that the frame value for time codes matches that for real time.

EE mode
Abbreviation of Electric to Electric mode. Video and audio signals are supplied to the VTRs internal circuits, but not to the recording heads.

External synchronization
Synchronization of the signals and tape transport of a VTR with those of a reference VTR.

Guard bands
These are unrecorded regions between adjacent tracks on a tape which prevent crosstalk between the signals on the two tracks. In jog/shuttle mode, since the path of the heads crosses the tracks, the guard bands can appear as horizontal bars (noise bars) on the monitor screen. The same problem can occur during normal playback if the tracking of the heads is not adjusted correctly.

IRE
A unit for expressing video level as determined by the Institute of Radio Engineers (now called the Institute of Electrical and Electronic Engineers).

LNG recording
Abbreviation of longitudinal recording. A method of recording audio signals by radio frequency bias method on the longitudinal track of the tape using the fixed head.

LTC
Abbreviation of Longitudinal Time Code. A time code recorded in a separate track at the edge of the tape.

Luminance signal
The signal that determines the brightness of the picture. Also called Y signal. One of the component signals.

Metal tape
Magnetic tape coated with microscopic particles of metal dispersed in a liquid binder. It allows high-density recording.

Moisture condensation
Condensation of moisture on the tape transport mechanisms. If moisture condenses on the head-drum, the tape adheres to the drum and causes malfunction.

Non-drop-frame mode
A mode of advancing the time code in such a way that the difference in frame values between real time and the time code is neglected. Using this mode produces a difference of approximately 86 seconds per day between real time and time code, which causes problems when editing programs in units of seconds using the number of frames as a reference.

Oxide tape
Magnetic tape coated with microscopic particles of ferric oxide dispersed in a liquid binder.

Reference video signal
A video signal consisting of a sync signal or sync and burst signals, used as a reference.

RGB signals
Red, green and blue signals, representing the primary colors. Color television is displayed by mixing red, green and blue components.

R–Y signal
A chrominance signal determined by subtracting the Y (luminance) signal from the R (red) signal. One of the component signals.

SMPTE
Society of Motion Picture and Television Engineers.

S/N ratio
Abbreviation of Signal-to-Noise ratio. The higher the S/N ratio, the less noise and higher the picture quality.

Search mode
A VTR mode used when searching for specific scenes, by viewing the video output or time codes while playing back the tape at various speeds in forward or reverse direction.

Servo lock
Synchronizing the drum rotation phase and tape transport phase with a reference signal during playback and recording so that the video heads scan the tape in the same pattern during playback and recording.

Superimpose
To put a picture (or a set of characters) onto another so that both can be seen at the same time.

S-video input connector
A connector that inputs Y (luminance) and C (chrominance) signals separately to reduce interference between Y and C signals, and to help reproduce noiseless images.

Sync signal
A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning patterns of the video camera and the monitor.

TBC
Abbreviation of Time Base Corrector. Electronic circuits to electrically stabilize the playback signals by removing color variation and roll in the playback picture caused by irregularity in drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signals.
The TBC is designed for user adjustment of sync phase and subcarrier phase with reference to the reference video signal, or user adjustment of signal levels including video and chroma signal level.

TBS
Abbreviation of Time Base Stabilizer. Similar to TBC circuits, although not designed for user adjustment of sync phase and subcarrier phase with reference to the reference video signal, or user adjustment of signal levels including video and chroma signal level.

Time code
Signals recorded on the tape to supply information on tape position such as the hour, minute, second and frame, to assist in setting edit points or searching for particular scenes. There are two types of time code: LTC and VITC.

Tracking
Electrically controlling the video head so that the playback phase matches the recording phase of the tape. Especially when playing back the tape with a VTR other than the one used for recording, adjusting the tracking prevents noise from appearing on the picture.

User's bits
Sections of the time code consisting of a total of 32 bits used for recording information such as the year, month and day, tape ID number or a program ID number.

V-blanking
The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in the cameras and monitors are turned off so that they can return from the bottom of the screen to the top without showing traces of movement on the screen. When the position of V-blanking is not adjusted correctly, a horizontal black bar appears on the screen.

VBS
Abbreviation of Video, Burst and Sync. A composite signal consisting of video signal, burst signal and sync signal.

VITC
Abbreviation of Vertical Interval Time Code. Time code recorded on a video signal track during V-blanking interval. It can be read correctly even during slow or still picture playback.

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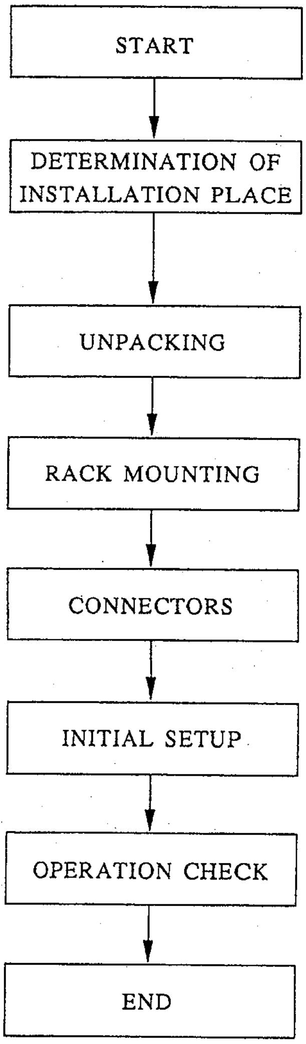
SECTION 2
INSTALLATION

Be sure to install the UVW-1700G/1700GP/1400A/1400AP in location satisfying the required operational environment described below to assure the UVW-1700G/1700GP/1400A/1400AP superior performance and to maintain the excellent serviceability and accessibility.

2-1. INSTALLATION PROCEDURE



···2-2. OPERATIONAL ENVIRONMENT
···2-3. OPERATING VOLTAGE
···2-4. INSTALLATION SPACE

···2-5. SUPPLIED ACCESSORIES

···2-7. RACK MOUNTING

···2-8. MATCHING CONNECTORS
···2-9. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

···2-10. INSTALLATION SETUP AND ADJUSTMENT

···If an error message is shown on the time counter, refer to Section 3-4. ERROR MESSAGE in SERVICE MANUAL VOL. 1.

2-2. OPERATIONAL ENVIRONMENT

• Operating temperature	:	+5 °C to +40 °C
• Humidity	:	80 % or less
• Storage temperature	:	–20 °C to +60 °C
• Locations to avoid	:	• Areas where the unit will be exposed to direct sunlight or any other strong lights. • Dusty areas or areas where it is subject to vibration. • Areas with strong electric or magnetic fields. • Areas near heat sources. (Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation. Do not block the ventilation holes on the cabinet and the rear panel.)
• Horizonal condition	:	within ±30°

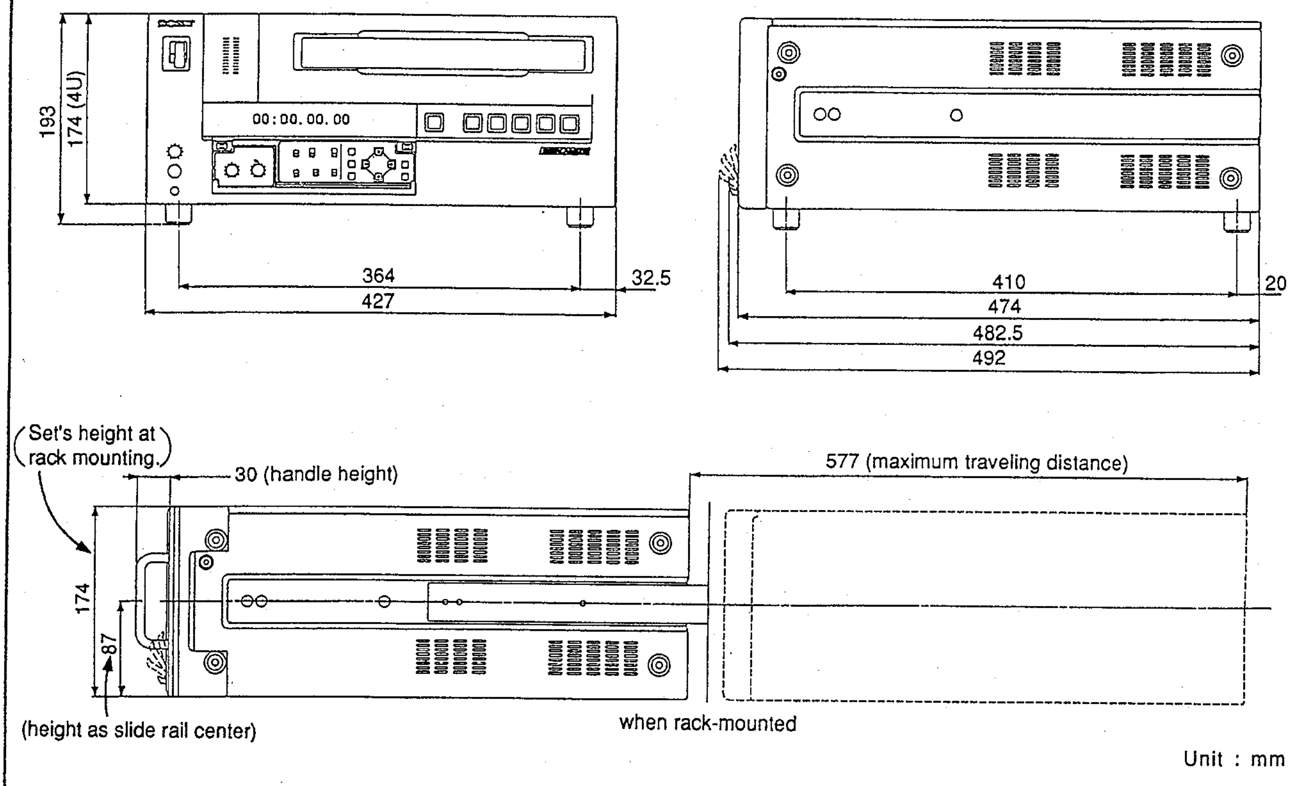
2-3. OPERATING VOLTAGE

- Power voltage : AC 120 V (For UVW-1700G/1400A)
  AC 220 to 240 V (For UVW-1700GP/1400AP)
- Power frequency : 50/60 Hz
- Power consumption : 85 W

2-4. INSTALLATION SPACE

(1) The rear side must be at least 40 cm away from the walls for ventilation and maintenance.

(2) When the unit is operated on a desk or similar condition, assure that the clearance above the unit is at least 40 cm to provide accessibility to the printed circuit boards and other mechanical parts. Note that it is not necessary to provide the space when the unit is mounted in a rack since the printed circuit boards can be repaired after it is pulled out.


193
174 (4U)
00:00.00.00
364
427
32.5
410
474
482.5
492
20
Set's height at rack mounting.
30 (handle height)
577 (maximum traveling distance)
174
87
(height as slide rail center)
when rack-mounted
Unit : mm

2-5. SUPPLIED ACCESSORIES

- AC power cord (1)
- Operation Manual (1)
- Protocol Manual (1)

2-6. OPTIONAL ACCESSORIES

- Rack mount Kit : RMM-130
  (The unit can be mounted in a 19-inch standard rack)
- Cleaning cassette tape : BCT-5CLN
- Remote control unit : SVRM-100/100A
- S-video cable : YC-15V
- Foot switch : FS-20 (For UVW-1400A/1400AP)

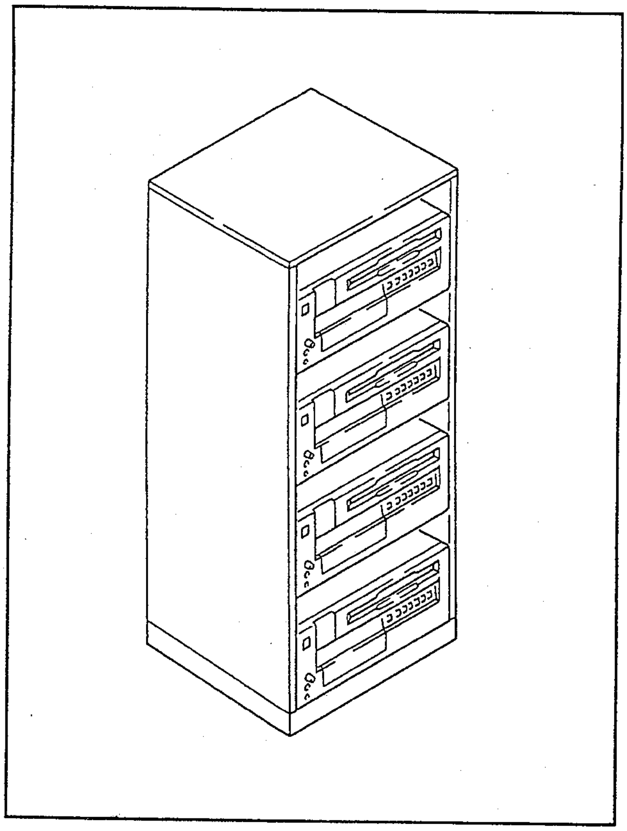
2-7. RACK MOUNTING

The unit can be mounted in a 19-inch standard rack.
It is recommended to use the following kit.

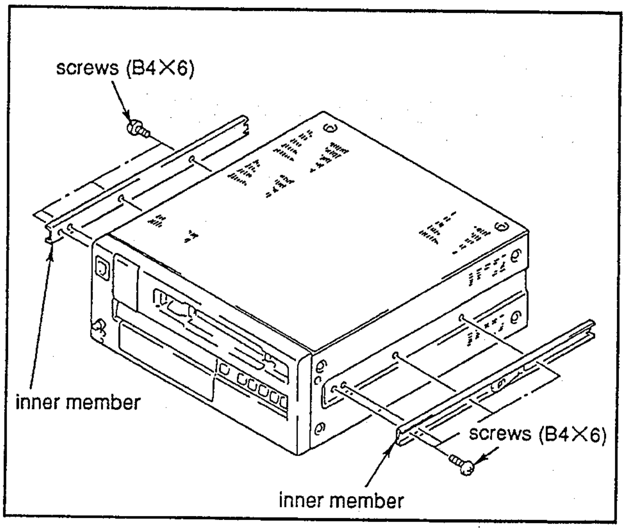
Rack Mount Kit : RMM-130 (optional accessory)
or
RACK-MOUNT SLIDES : MODEL 305
slide length 22 inch
(ACCURIDE) .

Note for rack mounting :

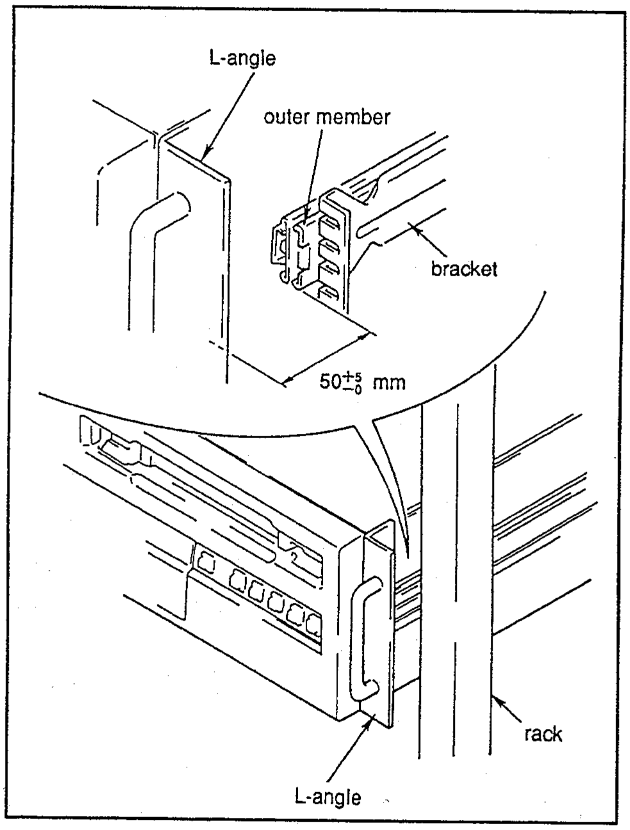
- When several VTRs are mounted in a rack, it is recommended to install a fan for ventilation. Good air circulation is essential to prevent internal heat build-up in a rack (5 °C to 40 °C must be met for all units).
- Never remove an upper panel and lower panel during rack mounting.
- Be sure to secure the rack to the floor to avoid accidents when a unit is pulled out.
- Connect long enough cables on the connector panel, considering that the unit is pulled out.
- This equipment can use with three tiers.
  But with four tiers and more, keep the spaces between the each VTRs in the rack 1 unit (about 44 mm) or more.



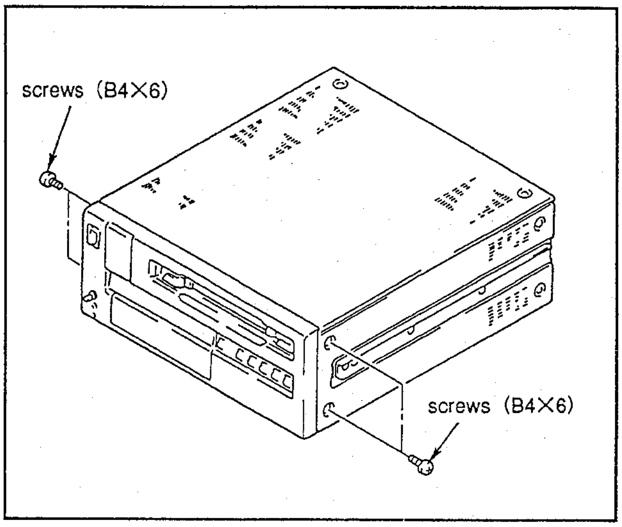
1. Remove the four screws on right and left side panels.
   And install the Inner Members of the rails to the right and left side panels with the screws removed.



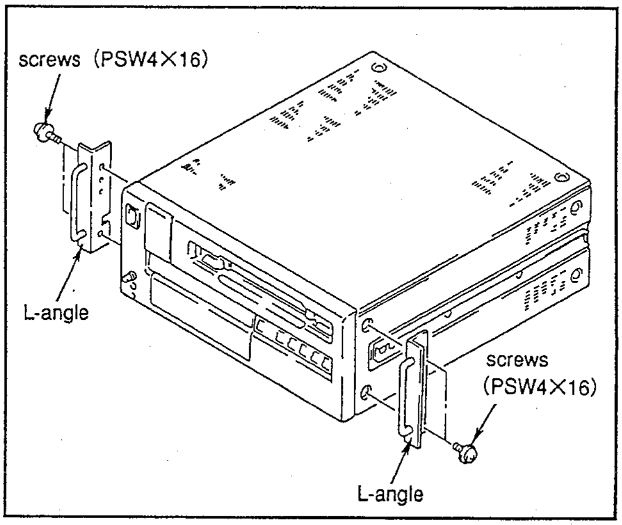
2. Install the Outer Member Brackets of the slide rails to the rack. Adjust the distance from the edge of the slide rail to the outside of the rack so that it meets the required specification.



3. Remove the two screws (B4×6) on the right and left side panels. (Be careful not to lose these four screws.)


screws (B4X6)
screws (B4X6)

4. Install the L-angles to the holes described in step 3 with the supplied screws (PSW4×16) in RMM-130 for these L-angles.


screws (PSW4X16)
L-angle
screws (PSW4X16)
L-angle

NOTE: Never use screws PSW4×16 to install the right and left side panels without L-angles. Be sure to install the panels with the screws B4×6 removed in step 3. Screws for L-angles are longer than the side panels. Therefore, using the screws PSW4×16 may cause trouble in the unit.

2-8. MATCHING CONNECTORS

When external cables are connected to the connector on a connector panel during maintenance, the hardware listed below (or equivalents) must be used.

UVW-1700G/ 1700GP	**UVW-1400A/ 1400AP**	**UVW-1700G/1700GP/1400A/1400AP side Connector**	**Matching Connector/Cable**	
		Panel Indication	**Connector/Cable**	**Sony Part No.**
		VIDEO INPUT	BNC, MALE	1-560-069-11
○	○	VIDEO		
○	○	REF. VIDEO		
○	○	RGB/COMPONENT (G/Y, R/R-Y, B/B-Y)		
○	○	S-VIDEO	YC-15V (1.5 m)	optional accessory
		VIDEO OUTPUT	BNC, MALE	1-560-069-11
○	○	1/2		
○	○	RGB/COMPONENT (G/Y, R/R-Y, B/B-Y)		
○	○	S-VIDEO	YC-15V (1.5 m)	optional accessory
○	○	AUDIO INPUT CH-1/CH-2	XLR, 3P, MALE	1-508-084-00
○	○	AUDIO OUTPUT CH-1/CH-2	XLR, 3P, FEMALE	1-508-083-00
○	○	MONITOR AUDIO	PIN PLUG	Standard Product
○	○	REMOTE (RS-232C)	CONNECTOR, D-SUB 25P, MALE and JUNCTION SHELL, 25P	1-560-904-11 1-563-377-11
○		REMOTE (RS-422A)	CONNECTOR, D-SUB 9P, MALE and JUNCTION SHELL, 9P	1-560-651-00 1-561-749-00
			RCC-5G (5m)	supplied accessory
			RCC-10G (10m) RCC-30G (30m)	optional accessory
○	○	REMOTE OUT	Stereo mini plug	Standard Product
			RK-G34 (3m)	optional accessory
	○	REMOTE 2 (FOOT SW)	Stereo mini plug	Standard Product

2-9. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

INPUT

REF VIDEO : BNC×2 (Bridging connection)
Black burst or composite video 1.0 Vp-p, 75 Ω (ON/OFF), sync negative
Composite sync 0.2 to 5.0 Vp-p, 75 Ω, negative (when using component signals)

VIDEO INPUT : BNC×2 (bridging connection)
composite video, 1.0Vp-p, 75 Ω (ON/OFF), sync negative

RGB/COMPONENT : BNC×3
G/Y : 1.0 Vp-p, 75 Ω, sync negative
R/R-Y: 0.7 Vp-p, 75 Ω
B/B-Y: 0.7 Vp-p, 75 Ω

S-VIDEO : Circular 4 pin
Y : 1.0 Vp-p, 75 Ω, sync negative
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO INPUT CH-1/2 : XLR 3 pin×2
+4 dBu, 600 Ω or 10 kΩ, balanced
(0 dBu=0.775 Vrms)

OUTPUT

VIDEO OUTPUT 1/2 : BNC×2
composite video, 1.0 Vp-p, 75 Ω, sync negative
Superimposed time code etc. output from VIDEO OUTPUT 2, as specified by CHARACTER switch on a sub control panel.

RGB/COMPONENT : BNC×3
G/Y : 1.0 Vp-p, 75 Ω, sync negative
R/R-Y: 0.7 Vp-p, 75 Ω
B/B-Y: 0.7 Vp-p, 75 Ω

RGB SYNC : BNC×1
Composite sync (no burst), 2.0 Vp-p, 75 Ω, negative

S-VIDEO : Circular 4 pin
Y : 1.0 Vp-p, 75 Ω, sync negative
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO OUTPUT CH-1/2 : XLR 3 pin×2
+4 dBu (600 Ω load), low impedance, balanced
(0 dBu=0.775 Vrms)

MONITOR AUDIO : PHONO JACK
–6 dBu (47 kΩ load), unbalanced
(0 dBu=0.775 Vrms)

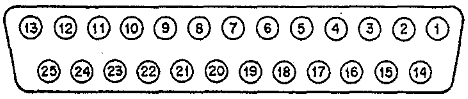
HEADPHONES : Stereo phone jack
–14 dBu max. (8 Ω load)
(0 dBu=0.775 Vrms)

CONTROL S : Stereo mini jack

REMOTE (D-SUB 25 pin : FEMALE)

This is conformed to RS-232C.

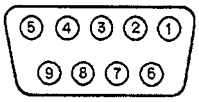
<external view>



Pin No.	Input/Output Signal	Operating Voltage
1	Frame Ground	ON : more than +5 V OFF: less than –5 V
2	Transmit Data	
3	Receive Data	
4	Request to Send	
5	Clear to Send	
6	Data Set Ready	
7	Signal Ground	
8	——	
9	——	
10	——	
11	——	
12	——	
13	——	
14	——	
15	——	
16	——	
17	——	
18	——	
19	——	
20	Data Terminal Ready	
21	——	
22	——	
23	——	
24	——	
25	——	

REMOTE (D-SUB 9 pin : FEMALE)
This is conformed to RS-422A.

<external view>

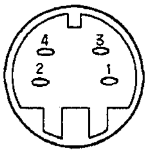


Pin No.	Controlling Device	Controlled Device
1	Frame Ground	Frame Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	——	——
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Frame Ground	Frame Ground

S-VIDEO (Circular 4 Pin)

Pin No.	Input/Output Signal
1	Y (G)
2	C (G)
3	Y (X)
4	C (X)

<external view>



2-10. INSTALLATION SETUP AND ADJUSTMENT

2-10-1. Switch Settings on the Connector Panel and Sub Control Panel

When the unit is installed, be sure to perform the following setup and adjustment. If these adjustment is not performed, the unit may not operate properly.

(1) Audio input level switch setting : 600 Ω ON/OFF
ON ; +4 dBu, 600 Ω, balanced
OFF ; +4 dBu, 10 kΩ, balanced

(2) 75 Ω termination switch setting : REF VIDEO 75 Ω ON/OFF
INPUT VIDEO 75 Ω ON/OFF
ON ; When this unit is connected at the end of the line.
OFF ; When other unit is connected in series after this unit.

} .....Connector panel

(3) VIDEO INPUT select switch setting: VIDEO IN COMPONENT/COMPOSITE/S VIDEO
COMPONENT ;
  Y-R, B ; Luminance/color difference component signal
  RGB ; RGB (three primary colors) signal (Sync signal should be added to G signal.)
COMPOSITE ; Ordinary video signal
S VIDEO ; Y/C separation type S Video signal

(4) COMPONENT OUT select switch setting : COMPONENT OUT ;
  Y-R, B ; Luminance/color difference component signal
  RGB ; RGB (three primary colors) signal (Sync signal should be added to G signal.)

} .....Sub control panel

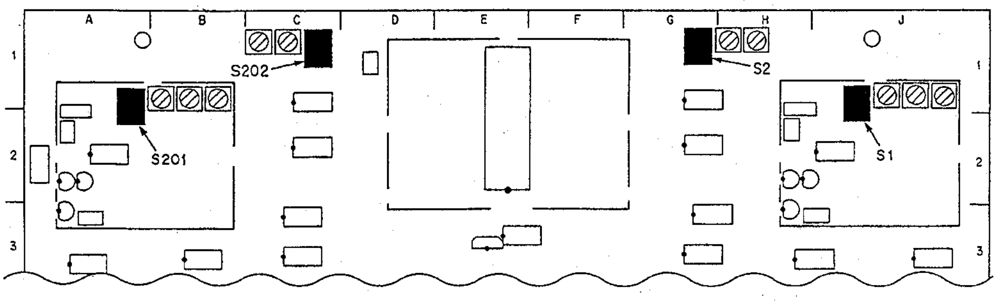
2-10-2. On-board Switch Setting

Only the four switches (S2 : AP-31, S202 : AP-31, S103/AR-14, S203/AR-14) marked by ____ in the following tables require setting in installation.

Do not make any attempt to alter the setting of the remaining switches exept for servicing.

If the switch settings changed, perform fail to feature.

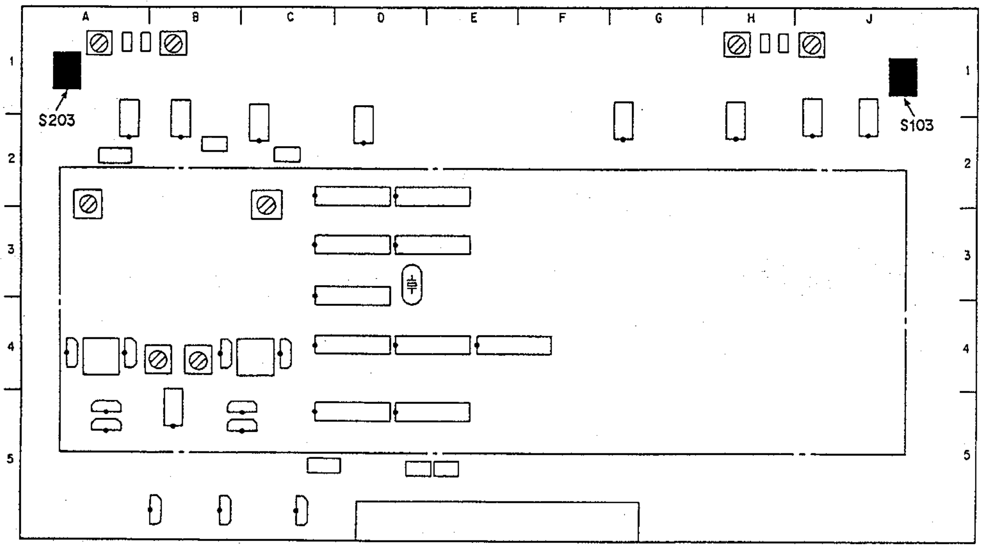
AP-31 Board



Switch No.	Function	Description	FACTORY SETTING
S1	CH-1 AUDIO HEAD TUNE ADJ SW	The high frequency response characteristics (head tuning) of head amplifier is optimized by the combination of RV1 (S1) and RV201 (S201) for channel 1 and 2. Use them only in the audio head tuning adjustment. If the above switch setting is changed other mode, the audio frequency response chatacteristics is impaired.	Set to the position based on the adjustment condition.
S2	CH-2 AUDIO HEAD TUNE ADJ SW		

Switch No.		Function	Output Level (dBu)			Description
			+4	0	-6	
S2	1	CH-1 AUDIO OUTPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 1 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2		OFF	OFF	ON	
S202	1	CH-2 AUDIO OUTPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 2 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2		OFF	OFF	ON	
FACTORY SETTING		—	○			—

AR-14 Board



Switch No.		Function	Input Level (dBu)			Description
			+4	0	–6	
S103	1	CH-1 AUDIO INPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 1 input. Selects among +4 dBu, 0 dBu and –6 dBu.
	2		ON	OFF	OFF	
S203	1	CH-2 AUDIO INPUT REF. LEVEL SELECT SW	OFF	ON	OFF	Selects the reference signal level of channel 2 input. Selects among +4 dBu, 0 dBu and –6 dBu.
	2		ON	OFF	OFF	
FACTORY SETTING		—	○			—

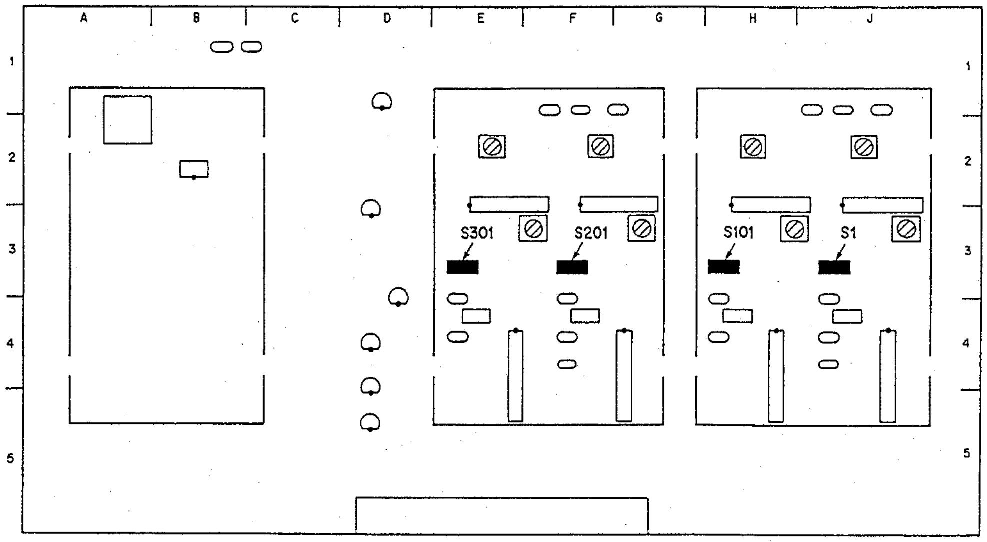
NOTE: Setting the audio input/output level

When connecting Sony VTR, Sony audio mixer "MTP series" or multiple UVW-1700G/1700GP/1400A/1400APs to each other, using XLR cables directly, select +4 dBu (factory default setting).

When connecting Sony VTR SVO-9600/9600P series and others having the pin-jack type input/output connector, using XLR ⟷ pin-jack conversion cable, select –6 dBu normally.

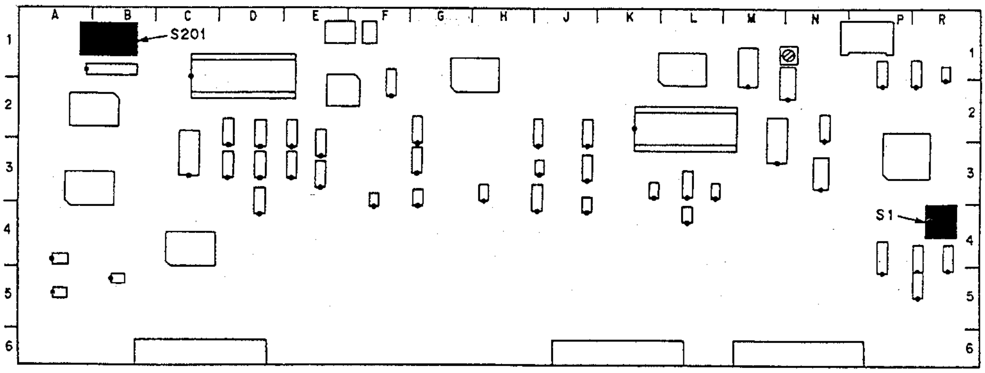
For more detail check the audio reference level of the equipment connected, and select for optimum setup.

RP-70 Board



Switch No.	Function	Description	FACTORY SETTING
S1	Y Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of Y signal channel-A (S1) and -B (S101). After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	ON
S101	Y Bch REC CURRENT BYPASS SW		
S201	C Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of C signal channel-A (S201) and -B (S301). After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	
S301	C Bch REC CURRENT BYPASS SW		

SS-61 Board

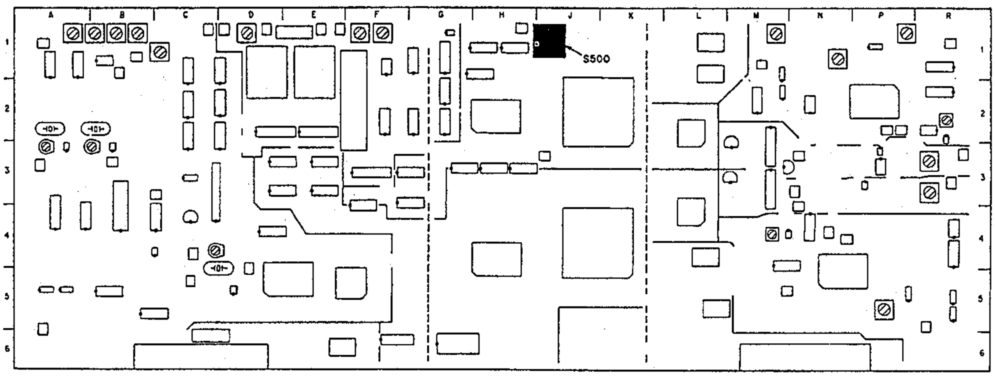


Switch No.		Function	ON	OFF
S1	1	SYSTEM ID SW	UVW-1700G/1700GP	UVW-1400A/1400AP
	2		factory use	factory use
	3		for J	for UC/EK
	4		NTSC	PAL

※ □ FACTORY SETTING
S1-1, S1-3, S1-4, are set to the position based on the unit.
If the initial switch settings are changed, perform fail to feature.

Switch No.		Function	Description	FACTORY SETTING
S201	1	SYSTEM DIP SW	Set this switch to ON (CLOSE) during several adjustment modes. It enables the following function changes. 1. "FACTORY USE" is displayed in the setup menu. The selected menu can be executed. 2. Search speed in LOCAL is changed. PLAY/F. FWD pressed simultaneously : FWD search×5 PLAY/REW pressed simultaneously : REW search×5 3. Tape speed in F.FWD/REW is displayed on the monitor. 4. VTR type is displayed on the time counter when power is turned on. (example : NTSC (J) EDITOR) 5. Hours meter can enter reset mode. 6. EEPROM can enter all reset mode. 7. Adjustment switches S500-1/TBC-28, S201/VRA-7 are validated.	OFF (OPEN)
	2		When this switch is turned ON (CLOSE), the audio noise reduction (NR) is forced to OFF.	
	3		factory use	
	4		When this switch is turned ON (CLOSE), tape protection like slack delection is inhibited. This function is used for mechanism and servo system alignment.	
	5		When this switch is turned ON (CLOSE), CTL signal detection is inhibited. This is used for head height adjustment and etc.	
	6		factory use	
	7		factory use	
	8		factory use	

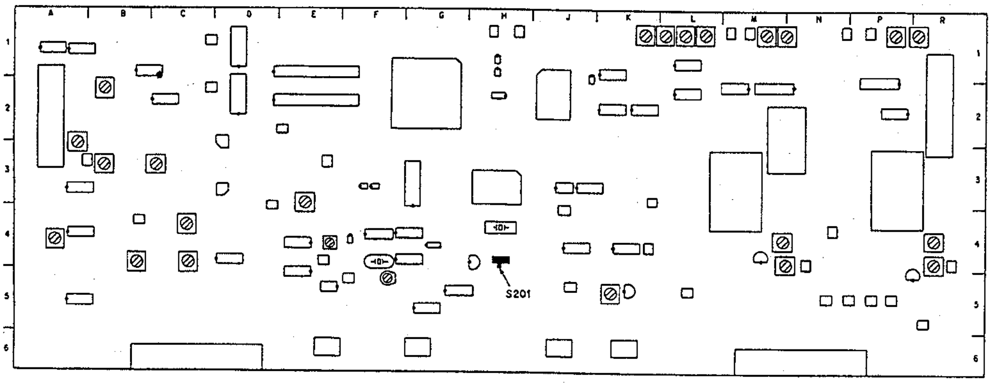
TBC-28 Board



The switch S500-1 becomes valid only when S201-1/SS-61 is set to ON (CLOSE).

Switch No.		Function	FACTORY SETTING
S500	1	LEVEL REF SW : Used for Y/C level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the D/A and A/D level. Make sure to set this to off after adjustment.	OFF
	2	Y MUTE SW : Y signal is muted from the TBC output. When this switch is set ON, Y signal is muted in the all video outputs.	
	3	C MUTE SW : R-Y and B-Y signals are muted from the TBC output. When this switch is set ON, the R-Y and B-Y signals are muted in the COMPONENT outputs. In addition only the chroma signal is muted in the COMPOSITE VIDEO OUT. (The color burst is not muted.)	
	4	G SYNC MUTE SW : When three BNC outputs are selected to RGB, sync signal is muted from the G output. When this switch is set to ON, only sync signal is muted in the G output.	

VRA-7 Board



The switch S201 becomes valid only when S201-1/SS-61 (B-1) is set to ON (CLOSE).

Switch No.	Function	Description	FACTORY SETTING
S201	A/D LEVEL ADJ	Used for A/D level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the A/D level. Set surely to off after adjustment.	OFF

2-10-3. Precautions After Installation

Observe the following precautions when this equipment is used in system setup.

- The REF. VIDEO INPUT requires video signal which complies with CCIR REP. 624.
- When this equipment is connected to the type of switcher that does not replace the sync signal, the SYNC/BURST level adjustment is required. (Refer Video Alignment Section.)

[SETTING CHECK SHEET]

Write down the setup information (setup menu and switches on board) before starting to repair the equipment. Make useful this information to re-setup after repair.

In an editing room where system connection is frequently changed, copy this sheet and write the several types of setup. Use of this sheet is recommended.

- Setup menu information can be saved separately from record area in this equipment. But some repair can lose the saved information. This sheet is effective for the backup.

SUB CONTROL PANEL

VIDEO IN	☐ COMPONENT	☐ COMPOSITE	☐ S VIDEO
	☐ Y-R, B	☐ RGB	
COMPONENT OUT	☐ Y-R, B	☐ RGB	
REMOTE/LOCAL	☐ REMOTE	☐ LOCAL	
CTL/LTC/U-BIT	☐ CTL	☐ LTC	☐ U-BIT
CHARACTER	☐ ON	☐ OFF	
CH1 REC VOL	0 2 4 6 8 10		
CH2 REC VOL	0 2 4 6 8 10		
HEADPHONES			

CONNECTOR PANEL

AUDIO INPUT CH-1 600 Ω	☐ ON	☐ OFF
AUDIO INPUT CH-2 600 Ω	☐ ON	☐ OFF
REF. VIDEO INPUT 75 Ω	☐ ON	☐ OFF
VIDEO INPUT 75 Ω	☐ ON	☐ OFF

SETUP MENU

Menu Level 1	Menu Level 2/3		Factory Setting	Setting
REPEAT FUNCTION (for UVW-1400AP)	REPEAT MODE		OFF	
	REPEAT TOP		TAPE TOP	
	REPEAT END		VIDEO END	
	A PRESET		00 : 00 : 00 : 00	
	B PRESET		00 : 00 : 00 : 00	
OPERATIONAL FUNCTION	AUTO EE SELECT	CASSETTE OUT	EE	
		F. FWD/REW	PB	
		STOP	PB	
		STANDBY OFF	PB	
	LOCAL ENABLE		STOP & EJECT	
	AUTO REW		ENABLE	
	AFTER CUE-UP		STILL	

Menu Level 1	Menu Level 2/3		Factory setting	Setting
DISPLAY CONTROL	CHARA. POSITION			
	CHARA. TYPE		WHITE (with BKGD)	
	DISPLAY INFO		TIME DATA & STATUS	
	PEAK HOLD		OFF	
	BRIGHTNESS		100 %	
	ALARM		ON	
	REF. ALARM		ON (LIMITED)	
TIME CODE	RUN MODE		FREE RUN	
	UB BINARY GP		00 : NOT SPECIFIED	
	PHASE CORR.		OFF	
	CF FLAG		OFF	
TAPE PROTECTION	FROM STOP	STOP TIMER	8 MIN	
		NEXT MODE	STANDBY OFF	
	FROM STILL	STILL TIMER	8 MIN	
		NEXT MODE	STEP FWD	
VIDEO CONTROL	TBS DELAY		SYNC DELAY	
	BLANKING LINE	09,322 LINE	MASK	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
		16,329 LINE		
		17,330 LINE		
		18,331 LINE		
		19,332 LINE		
		20,333 LINE		
		21,334 LINE		
		22,335 LINE		
		23,336 LINE	HALF	
	BLANKING DECODE	09,322 LINE	BLACK & WHITE	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
		16,329 LINE		
		17,330 LINE		
		18,331 LINE		
		19,332 LINE		
		20,333 LINE		
		21,334 LINE		
		22,335 LINE		

Menu Level 1	Menu Level 2/3	Factory setting	Setting
INTERFACE CONTROL	REMOTE I/F (for UVW-1700GP)	RS-232C	
	RS-232C BPS	9600 BPS	
	FOOT SWITCH (for UVW-1400AP)	DOWN EDGE TRIGGER	
	VIDEO PRINTER	4 FIELD DELAY	
factory use	PWR. ON UNTH	ON	
MENU GRADE		BASIC	

SWITCH ON BOARD

Board	Switch	Factory Setting	Setting
AP-31 board	S1 : CH-1 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S2 : CH-1 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
	S201 : CH-2 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S202 : CH-2 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
AR-14 board	S103 : CH-1 AUDIO INPUT REF. LEVEL SELECT SW	S103-1 : OFF S103-2 : ON	
	S203 : CH-2 AUDIO INPUT REF. LEVEL SELECT SW	S203-1 : OFF S203-2 : ON	
RP-70 board	S1 : Y Ach REC CURRENT BYPASS SW	ON	
	S101 : Y Bch REC CURRENT BYPASS SW	ON	
	S201 : C Ach REC CURRENT BYPASS SW	ON	
	S301 : C Bch REC CURRENT BYPASS SW	ON	
SS-61 board	S1 : SYSTEM ID SW	Dependent on model	
	S201 : SYSTEM DIP SW	OFF (OPEN)	
TBC-28 board	S500-1 : LEVEL REF SW	OFF	
	S500-2 : Y MUTE SW	OFF	
	S500-3 : C MUTE SW	OFF	
	S500-4 : No use	OFF	
VRA-7 board	S201 : A/D LEVEL ADJ	OFF	

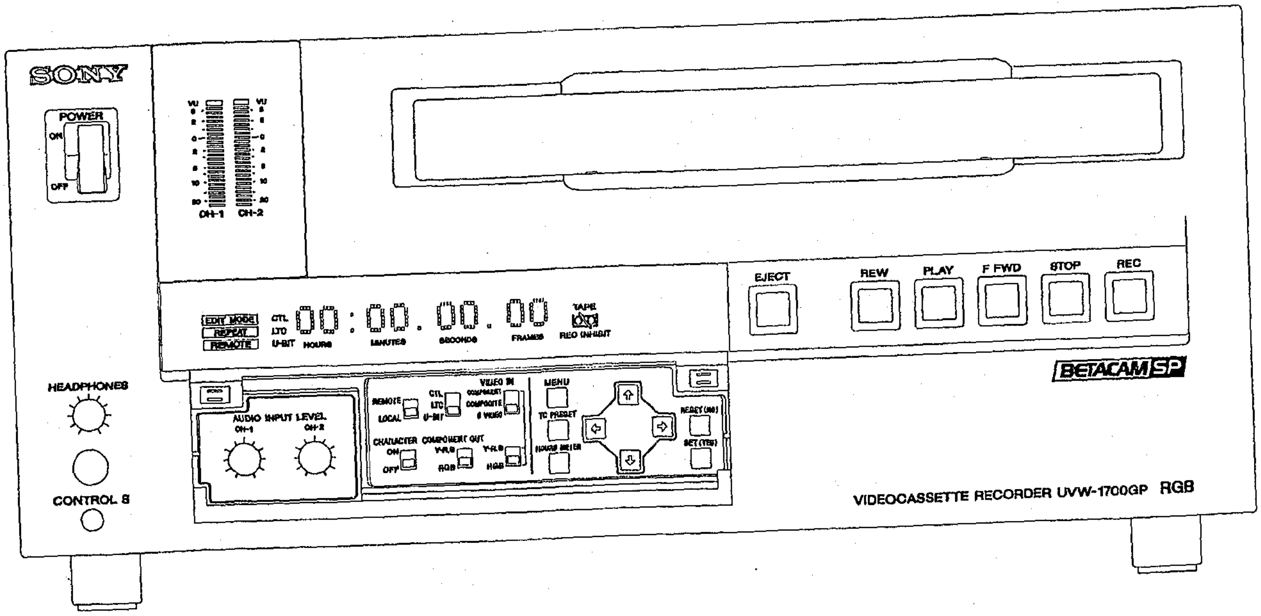
SECTION 3
SERVICE OVERVIEW

3-1. FUNCTION COMPARISON

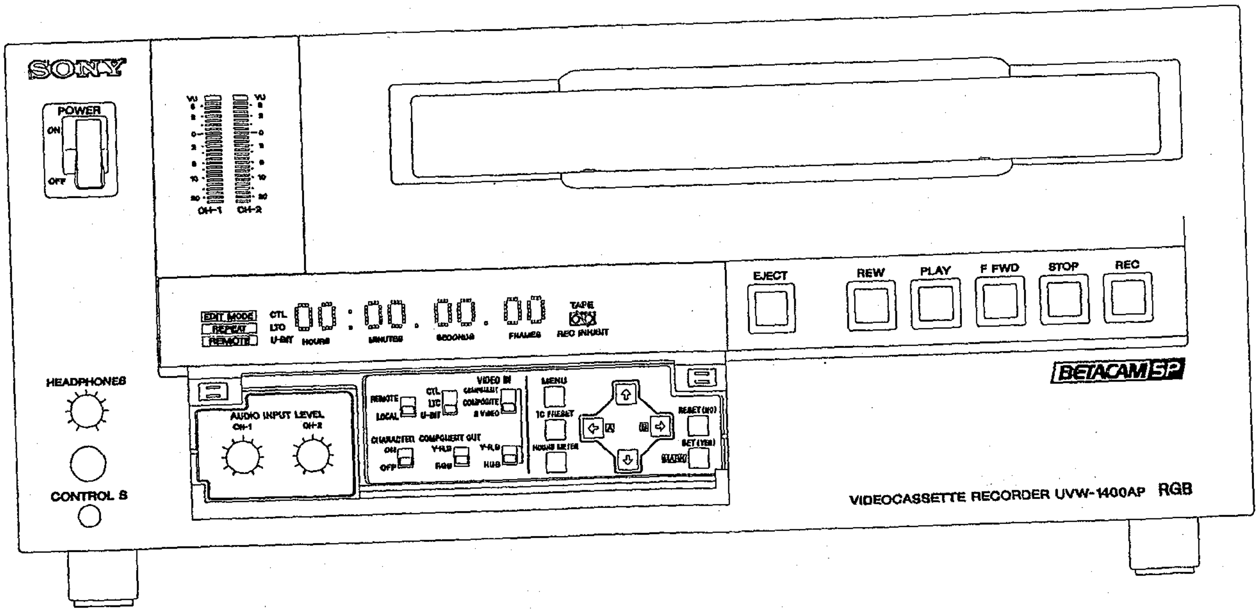
UVW-1700GP and UVW-1400AP are video cassette recorders.

Front panels of these units are as follows:

- **UVW-1700GP**

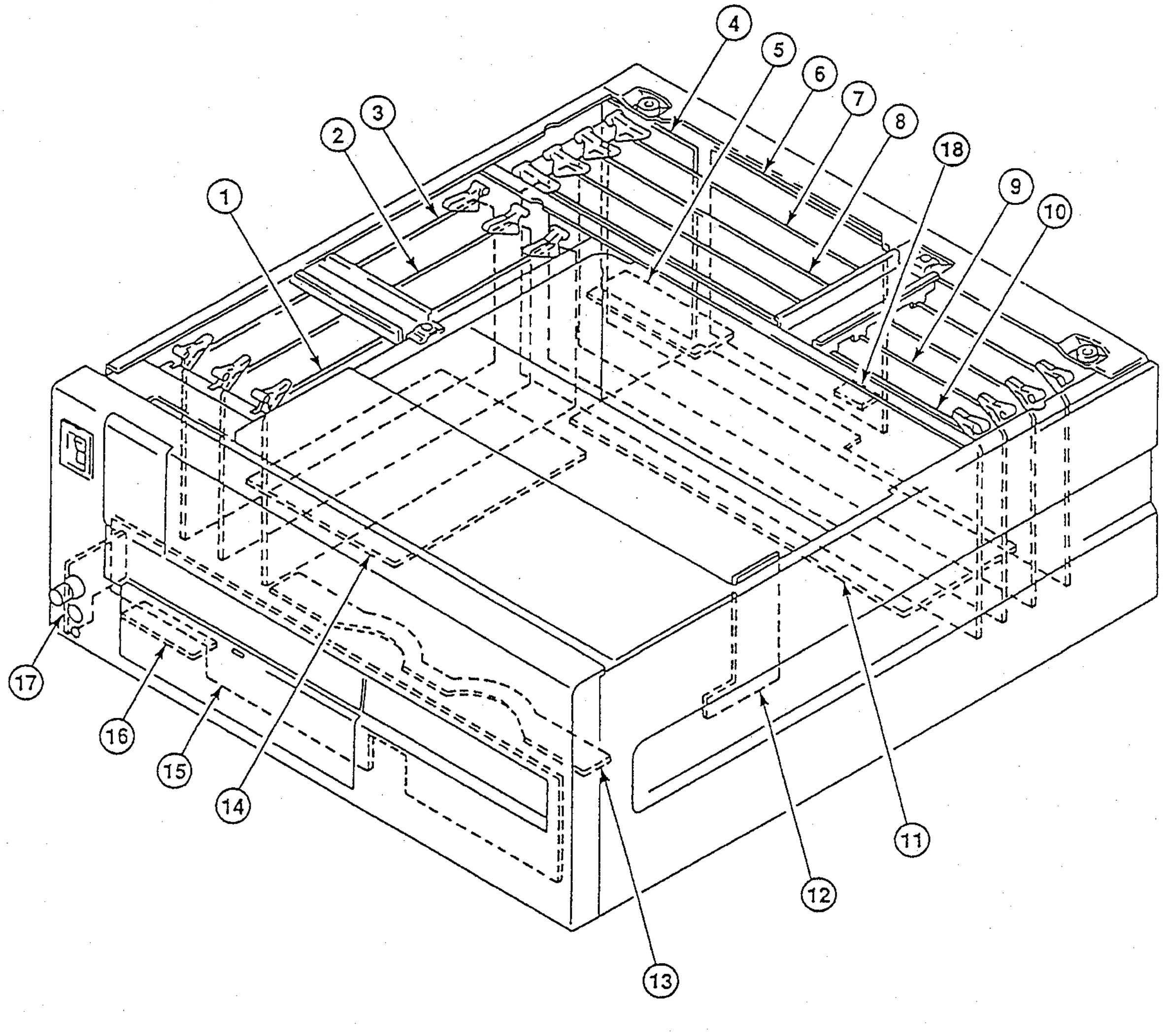

SONY
POWER
ON
OFF
VU
CH-1 CH-2
EDIT MODE
REPEAT
REMOTE
CTL
LTC
U-BIT
00:00.00.00
HOURS
MINUTES
SECONDS
FRAMES
TAPE
REC INHIBIT
EJECT
REW
PLAY
F FWD
STOP
REC
BETACAM SP
HEADPHONES
AUDIO INPUT LEVEL
CH-1 CH-2
CONTROL S
REMOTE
LOCAL
VIDEO IN
COMPONENT
COMPOSITE
S VIDEO
CHARACTER
COMPONENT OUT
ON
OFF
Y-R,B
RGB
MENU
TC PRESET
HOURS METER
RESET (NO)
SET (YES)
VIDEOCASSETTE RECORDER UVW-1700GP RGB

- **UVW-1400AP**

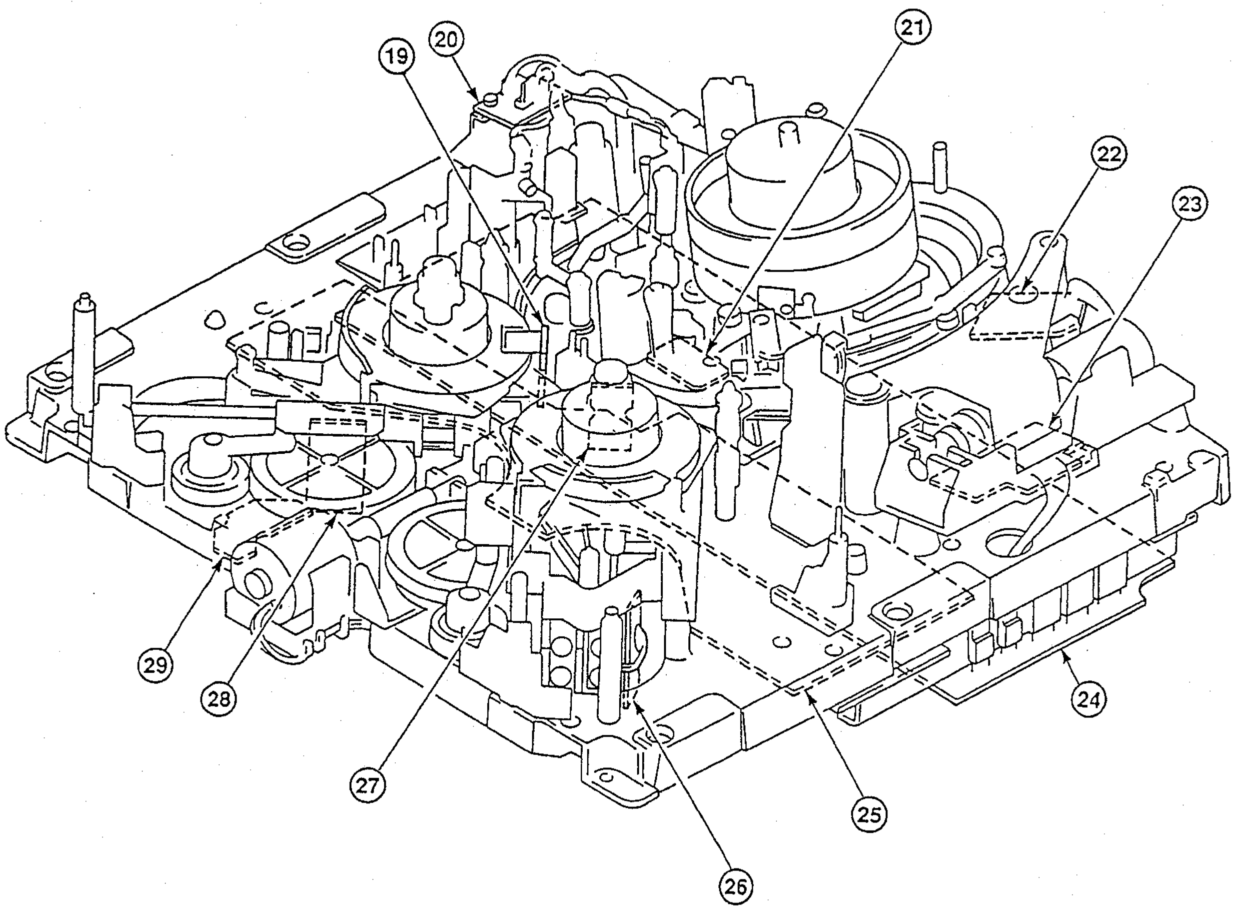

SONY
POWER
ON
OFF
VU
CH-1 CH-2
EDIT MODE
REPEAT
REMOTE
CTL
LTC
U-BIT
00:00.00.00
HOURS
MINUTES
SECONDS
FRAMES
TAPE
REC INHIBIT
EJECT
REW
PLAY
F FWD
STOP
REC
BETACAM SP
HEADPHONES
AUDIO INPUT LEVEL
CH-1 CH-2
CONTROL S
REMOTE
LOCAL
VIDEO IN
COMPONENT
COMPOSITE
S VIDEO
CHARACTER
COMPONENT OUT
ON
OFF
Y-R,B
RGB
MENU
TC PRESET
HOURS METER
RESET (NO)
SET (YES)
VIDEOCASSETTE RECORDER UVW-1400AP RGB

3-2. MAIN PARTS LOCATION

3-2-1. Location of the Printed Circuit Board



① RP-70P Board (UVW-1700GP)
RP-70BP Board (UVW-1400AP)
② AP-31BP Board
③ AR-14AP Board
④ CP-226 Board
⑤ CP-261 Board (UVW-1700GP)
CP-261A Board (UVW-1400AP)
⑥ CP-262 Board (UVW-1700GP)
CP-262A Board (UVW-1400AP)
⑦ VRA-7P Board
⑧ VP-44P Board
⑨ TBC-28P Board
⑩ SS-61 Board
⑪ MB-604P Board
⑫ CL-29 Board (Cassette compartment)
⑬ PC-70 Board (Cassette compartment)
⑭ MB-471 Board (UVW-1700GP)
MB-471B Board (UVW-1400AP)
⑮ KY-290 Board
⑯ VR-155 Board
⑰ HP-61 Board
⑱ RM-157 Board (UVW-1400AP)

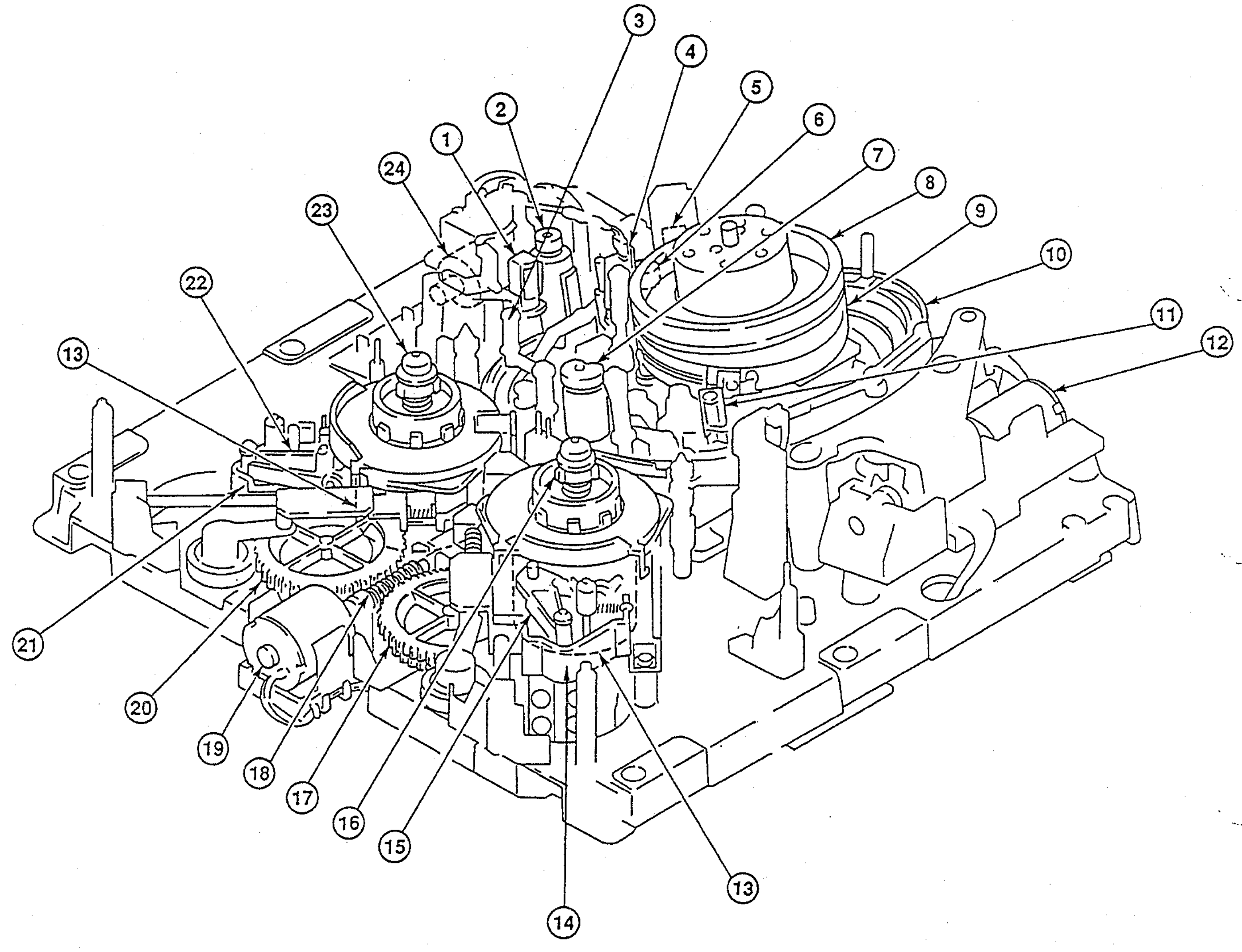


⑲ SE-207 Board (Supply side)
⑳ PD-35 Board
㉑ TR-84 Board
㉒ PTC-68 Board
㉓ PTC-67 Board
㉔ DR-214 Board
㉕ MS-39 Board
㉖ RM-127 Board (Take-up side)
㉗ SE-207 Board
㉘ RM-126 Board (Supply side)
㉙ PTC-66 Board

INDEX

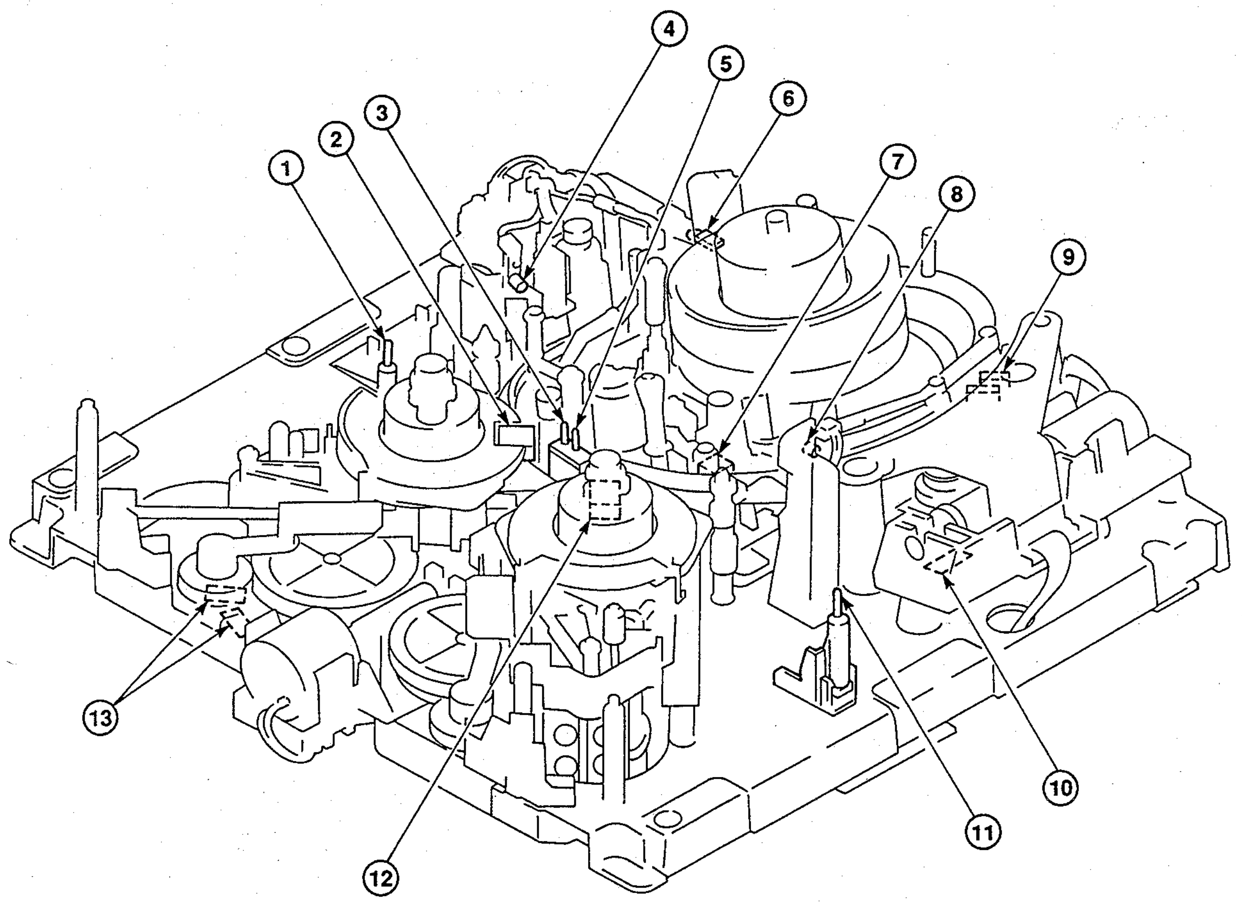
AP-31BP Board	②
AR-14AP Board	③
CL-29 Board (Cassette compartment)	⑫
CP-226 Board	④
CP-261 Board (UVW-1700GP)	⑤
CP-261A Board (UVW-1400AP)	
CP-262 (UVW-1700GP)	⑥
CP-262A (UVW-1400AP)	
DR-214 Board	㉓
HP-61 Board	⑰
KY-290 Board	⑮
MB-604P Board	⑪
MB-471 Board (UVW-1700GP)	⑭
MB-471B Board (UVW-1400AP)	
MS-39 Board	㉔
PC-70 Board (Cassette compartment)	⑬
PD-35 Board	⑳
PTC-66 Board	㉙
PTC-67 Board	㉓
PTC-68 Board	㉒
RM-126 Board	㉘
RM-127 Board	㉖
RP-70P Board (UVW-1700GP)	①
RP-70BP Board (UVW-1400AP)	
SE-207 Board	⑲㉗
SS-61 Board	⑩
TBC-28P Board	⑨
TR-84 Board	㉑
VP-44P Board	⑧
VR-155 Board	⑯
VRA-7P Board	⑦

3-2-2. Location of the Main Mechanical Parts/Components



① Full erase head assembly/Tape cleaner assembly
② Capstan motor
③ Tension regulator arm
④ CTL head
⑤ Audio/TC head
⑥ Cleaning roller
⑦ Pinch roller assembly
⑧ Upper drum assembly
⑨ Drum assembly
⑩ Loading ring assembly
⑪ AT cleaner
⑫ Gear box motor
⑬ Reel motor
⑭ RS table (T) assembly
⑮ T break assembly
⑯ T reel table assembly
⑰ T worm wheel
⑱ Worm gear (LS motor)
⑲ Reel position motor
⑳ S worm wheel
㉑ RS table (s) assembly
㉒ S break assembly
㉓ S reel table assembly
㉔ Pinch solenoid

3-2-3. Location of the Sensor (1)



① S cassette Miss-REC sensor
This is a record-inhibit sensor for the small cassette of a metal particle tape.

② S reel rotation detection sensor
The S reel rotation detection sensor detects the rotation of the S reel table.
The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

③ Reel hub diameter detection sensor
The reel hub diameter varies depending on the length of the tape wound on a cassette tape. The reel hub diameter detection sensor detects the reel hub diameter using a tab on the back side of the cassette tape.
The output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

④ Tape end sensor
During tape travelling in the FWD direction, the tape end sensor detects the end of tape.

⑤ Oxide tape/metal particle tape detection sensor
This sensor detects whether an oxide tape or metal particle tape is being inserted to the unit using a tab on the back side of the cassette tape.

⑥ Condensation sensor
This sensor detects whether moisture condensation occurs in the unit or not.

⑦ Tension sensor
During recording or playback, the S tension regulator arm activates to maintain constant tape tension.
The tension sensor detects the position of the tension regulator arm.

⑧ Tape beginning sensor
During tape travelling in the FWD direction, the tape beginning sensor detects the beginning of tape.

⑨ Threading-end/unthreading-end detection sensor
This sensor detects whether the loading ring is the threading-end or unthreading-end position.

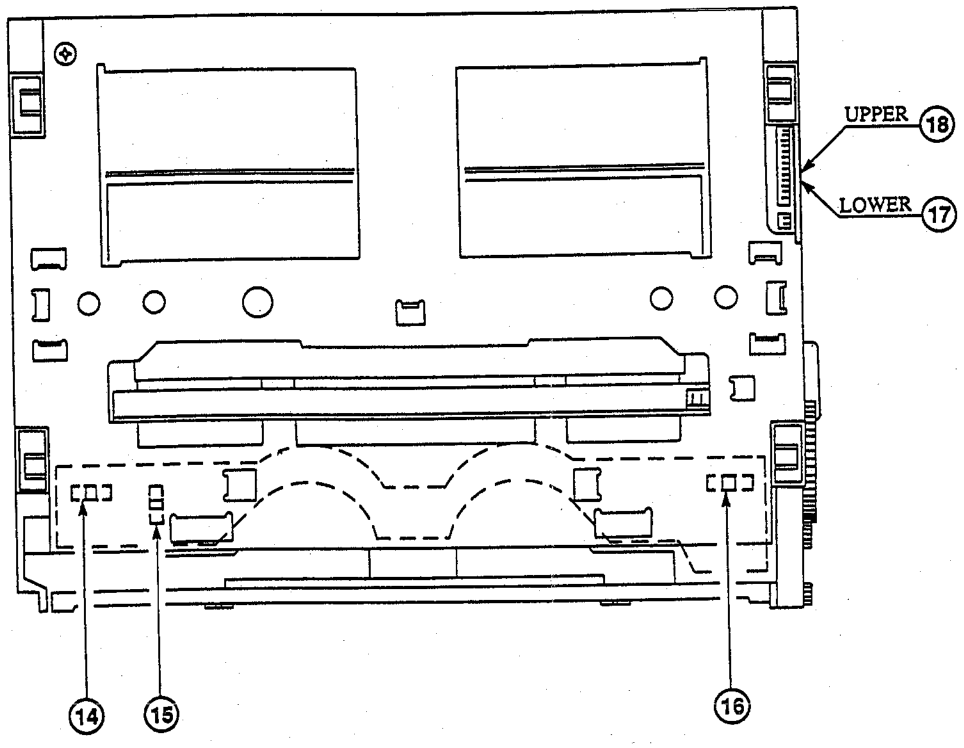
⑩ Gear box motor rotation detection sensor
The gear box motor rotation detection sensor detects the rotation speed of the gear box motor.
The FG output signal of this sensor inputs to the servo circuit, and controls the threading speed to protect the tape from the excessive tension.

⑪ L cassette Miss-REC sensor (For metal particle tape).
This is a record-inhibit sensor for the large cassette of metal particle tape.

⑫ T reel rotation detection sensor
The T reel rotation detection sensor detects the rotation of the T reel table.
The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.

⑬ Reel L/S position sensor
This sensor detects whether the reel table is the correct position according to the size of the inserted cassette tape.

3-2-4. Location of the Sensor (2) .... Cassette Compartment



⑭ Cassette-in sensor (L)
This sensor detects whether a cassette is being inserted.

⑮ Cassette L/S size detection sensor
This sensor detects whether the inserted cassette tape is an L size or S size.

⑯ Cassette-in sensor (R)
This sensor detects whether a cassette is being inserted.

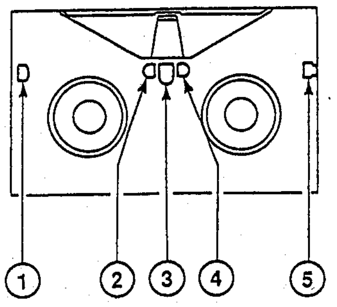
⑰ Cassette-down (2) sensor

⑱ Cassette-down (1) sensor
The (1) and (2) sensor detects the position of the cassette compartment by using the combination of ON/OFF operation of these sensors and cassette-in sensor.

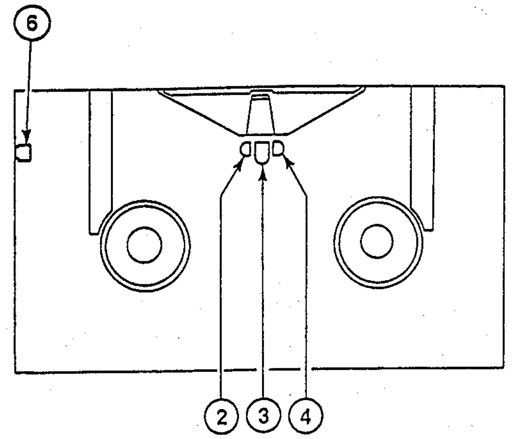
3-3. FUNCTION OF THE CASSETTE PLUG AND TAB

As shown in the figure below, plugs and tabs are provided at the back side of cassette tape.

S Cassette



L Cassette



① S cassette Miss-REC tab (for oxide tape) (Note 1)
② Video tape thickness detection tab (for oxide tape) (Note 2)
③ Oxide/metal particle tape detection tab (Note 3)
④ Reel hub diameter detection tab
⑤ S cassette Miss-REC plug (for metal particle tape)
⑥ L cassette Miss-REC plug

(Note 1) An oxide tape cannot be used for this VTR.
(Note 2) All metal particle tapes have a detection tab, because video tape thickness is one type.
(Note 3) Because of Note 1, if it detects an oxide tape, "TAPE" on and off on the display window on the front panel and displays that an unserviceable tape is loaded. And eject the cassette tape automatically.

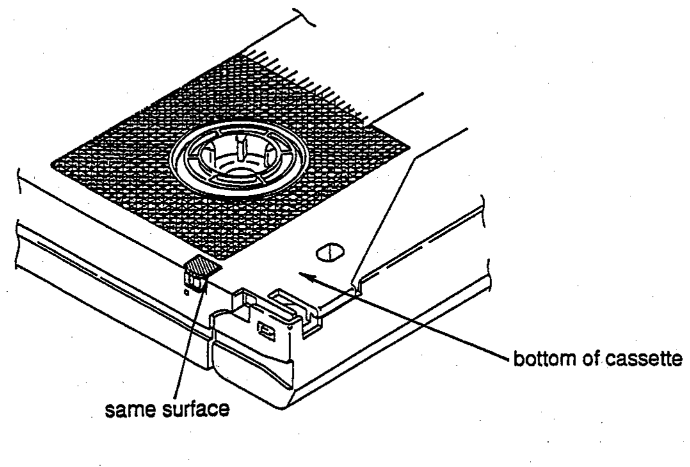


Fig. 1

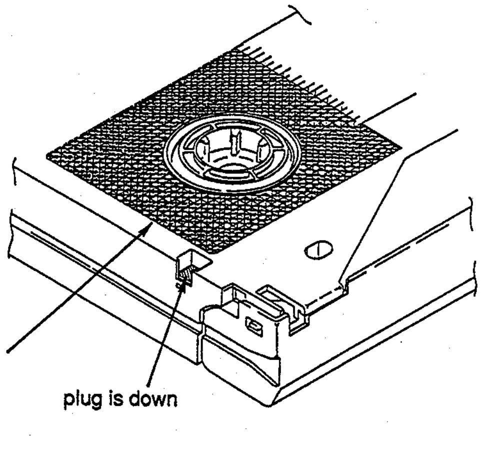


Fig. 2

The presence or absence of these plugs and tabs determines the cassette status as shown in the table below.

Plug and tab	**Cassette status with plugs and tabs**	**Cassette status without plugs and tabs**
S cassette Miss-REC tab (for oxide tape)	Cannot be used	
S cassette Miss-REC plug (for metal particle tape)	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
L cassette Miss-REC plug	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
Tape thickness detection tab	A 20 μm thick tape is wound on the cassette.	A 15 μm thick tape is wound on the cassette.
Oxide/metal particle tape detection tab.	An oxide tape is wound on the cassette.	A metal particle tape is wound on the cassette. (Note 3)
Reel hub diameter detection tab	For small hub	For large hub

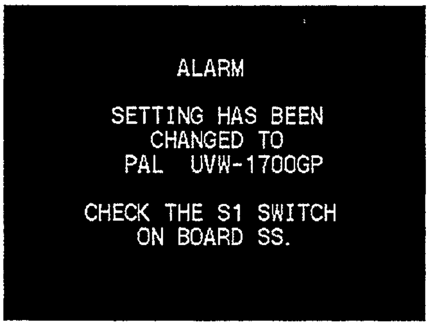
3-4. ERROR MESSAGE

3-4-1. Alarm

This unit features an alarm display function.
When a problem is detected, an alarm is displayed immediately in the time counter display on the control panel and an alarm and the message are displayed on the video monitor.
To display alarm and the message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.
This unit features two types of alarms. One is for operators, and the other is for service persons.
This manual shows alarms only for service persons.
As for operators, refer to operation manual or overview in this manual.
Activating alarm display may influence to the system. For example, when the reference video signal is not used.
Therefore, you can select whether or not to display the alarm from the Setup menu.
However, alarms for service persons are displayed regardless of Setup menu selection.

1. Alarms will be displayed as soon as power is turned on.

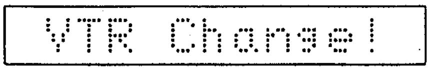
Detection : Checks the settings of switch S1 on the SS-61 board and the contents of electrically erasable/ programmable ROM (EEPROM).
Operation after detection
: None
Display : Displays until any button is pressed.



ALARM

SETTING HAS BEEN
CHANGED TO
PAL UVW-1700GP

CHECK THE S1 SWITCH
ON BOARD SS.



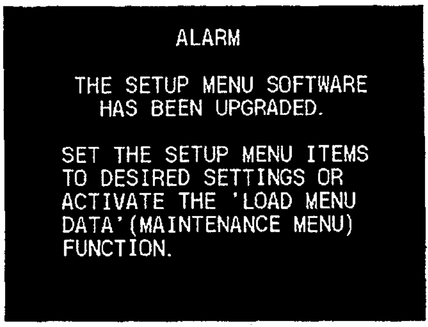
VTR Change!

Detection : Checks the version of Setup menu.

Operation after detection

: Setup menu is operated at factory setting. The contents of electrically erasable/programmable ROM (EEPROM) are not changed. Therefore, if the Setup menu is not reset, the same alarm will be displayed when the power is turned on.

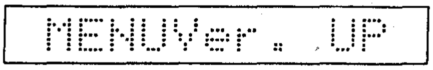
Display : Displays until any button is pressed.



ALARM

THE SETUP MENU SOFTWARE
HAS BEEN UPGRADED.

SET THE SETUP MENU ITEMS
TO DESIRED SETTINGS OR
ACTIVATE THE 'LOAD MENU
DATA' (MAINTENANCE MENU)
FUNCTION.



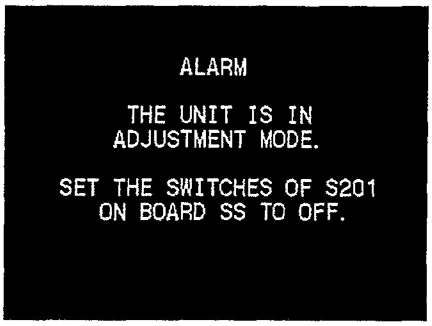
MENUVer. UP

Detection : Sets switch S201 on the SS-61 board to ON.

Operation after detection

: None

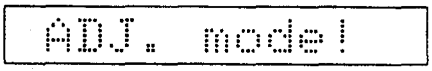
Display : Displays until any button is pressed.



ALARM

THE UNIT IS IN
ADJUSTMENT MODE.

SET THE SWITCHES OF S201
ON BOARD SS TO OFF.



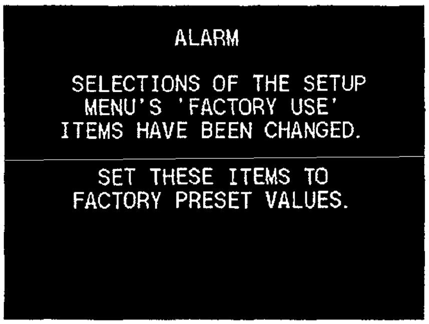
ADJ. mode!

Detection : FACTORY USE of Setup menu is changed.

Operation after detection

: None

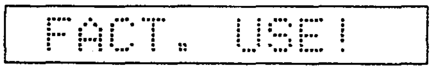
Display : Displays until any button is pressed.



ALARM

SELECTIONS OF THE SETUP
MENU'S 'FACTORY USE'
ITEMS HAVE BEEN CHANGED.

SET THESE ITEMS TO
FACTORY PRESET VALUES.



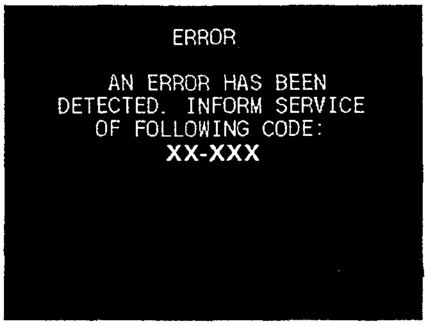
FACT. USE!

3-4-2. Error Code

This unit features the self-diagnostics to detect any problem. When a problem is detected, an error code is displayed immediately in the time counter display on the control panel and an error code and message are displayed on the video monitor.

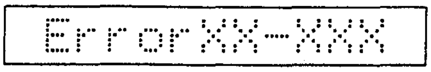
To display error code and message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.

NOTE : Indicates the error code number inspite of XX-XXX on the video monitor.



ERROR

AN ERROR HAS BEEN
DETECTED. INFORM SERVICE
OF FOLLOWING CODE:
XX-XXX

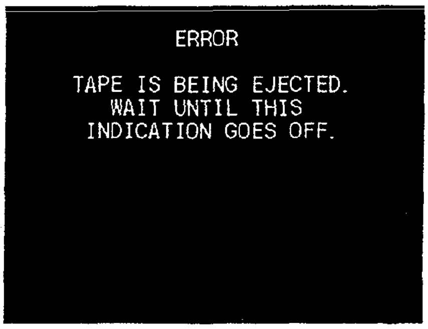


ErrorXX-XXX

After any problem is detected, some of error codes enter the unit to AUTO OFF.
(Refer to the tables as shown in page 3-18 and later. However, error code 08-032 is excluded.)
Therefore, when turning off the power once and then turning on, the error code or error code and message are displayed on the time counter or video monitor.

Then, the unit enters to AUTO OFF mode again.
In AUTO OFF mode, press the EJECT key. The unit enters the emergency EJECT mode.
The emergency EJECT mode refers to the mode in which the tape is gently ejected with the available motors under the assumption that a tape slack or device related problem has occurred.

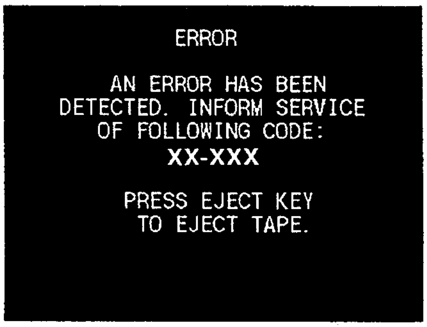
When the unit enters the EJECT mode, the following messages are displayed on the video monitor.
On the time counter, error code is displayed.



ERROR

TAPE IS BEING EJECTED.
WAIT UNTIL THIS
INDICATION GOES OFF.

When a cassette tape is removed with the emergency EJECT mode, the following messages are displayed on the video monitor. On the time counter, error code is displayed.



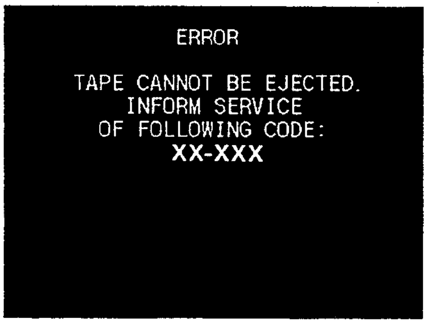
ERROR

AN ERROR HAS BEEN
DETECTED. INFORM SERVICE
OF FOLLOWING CODE:
XX-XXX

PRESS EJECT KEY
TO EJECT TAPE.

When a cassette tape cannot be removed with the emergency EJECT mode, the following messages are displayed on the video monitor.

On the time counter, error code is displayed.



ERROR

TAPE CANNOT BE EJECTED.
INFORM SERVICE
OF FOLLOWING CODE:
XX-XXX

When a cassette tape cannot be removed with the emergency EJECT mode, perform section 3-12.

1. Main code and sub code

• Main code

Main code is shown by two digits which indicates the system where the problem occurred.

Main code 0X : Servo and tape path systems problem
Main code 2X : Mechanical control system problem
Main code 3X : Sensors problem
Main code 9X : Communication and interface systems problem

• Sub code

Sub code is shown in three digits. Each digit has the following meanings.

When the main code is 0X or 2X:

```
X      X      X
|      |      |
|      |      3rd digit : Symptom
|      2nd digit : Device in which the problem is detected
1st digit : Mode in which the problem is detected
```

1st digit : Mode in which the problem is detected
0 : Mode cannot be determined. Or, determination of mode is necessary.
1 : Cassette-down mode
2 : Threading mode
3 : STOP mode
4 : F. FWD or REW mode
5 : SEARCH mode
6 : PLAY or REC mode
7 : STANDBY-OFF mode
8 : Unthreading mode
9 : Cassette-up mode
10 : Cassette-out mode
(A cassette tape is removed.)

2nd digit : Device in which the problem is detected
0 : Device cannot be determined. Or, determination of device is not necessary.
1 : Cassette up/down motor, or cassette up/down sensor
2 : Threading motor, FG or sensor
3 : Drum motor or FG
4 : Capstan motor or FG
5 : S reel motor or FG
6 : S reel brake solenoid
7 : T reel motor or FG
8 : T reel brake solenoid
9 : S/T reel motor or FG
A : Tension regulator
B : Pinch solenoid
C : Reel position motor or sensor

3rd digit : Symptom
0 : Determination of mode is not necessary.
1 : Operation cannot be completed within specified time.
2 : Detects that the speed is not normal.
3 : Detects the slack of the tape.
4 : FG cannot be detected.
5 : Detects FG.
6 : Detects the rotation is not normal.
7 : Detects the maximum tension.
8 : Detects the current is not normal.
9 : Full top or end cannot be released.
A : Retry (Once, unthreading, and then threading.)

When the main code is 3X:
The sub code of main code 3X is 000.

When the main code is 9X:

X X X

3rd digit : Symptom
2nd digit : CPU (u-COM) or IC of the connected device
1st digit : CPU (u-COM) or IC in which the problem is detected

1st and 2nd digits : CPU (u-COM) code
1 : System control main CPU
2 : Keyboard u-COM
3 : EEPROM
4 : Servo main CPU
5 : Servo sub u-COM
6 : TBC u-COM

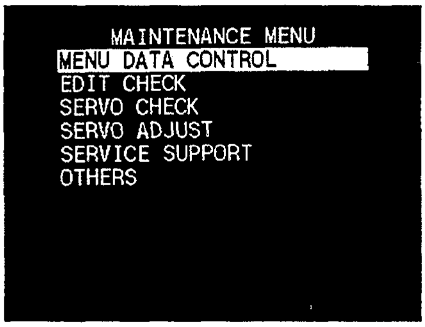
3rd digit : Symptom
1 : Check sum problem
2 : Over-running problem
3 : Parity problem
4 : Framing problem
5 : Interface cannot be completed within the specified time.
6 : Servo adjustment data on EEPROM problem
7 : Setup menu on EEPROM problem
8 : Hours meter on EEPROM problem

2. How to display the error codes that were previously detected

This unit memorizes the error code in electrically erasable/programmable ROM (EEPROM) when an internal problem is detected. (However, error code 9X-XXX is excluded.)
The error codes of the detected problems are displayed.

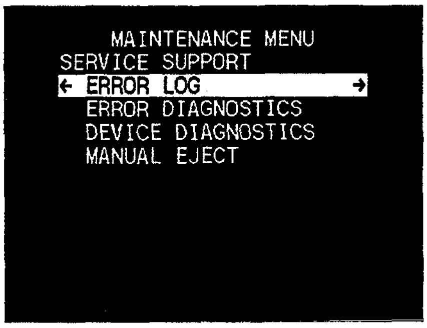
The procedures of displaying the error codes are as follows:

1. Press the MENU button while pressing the $\boxed{\leftarrow}$ button.



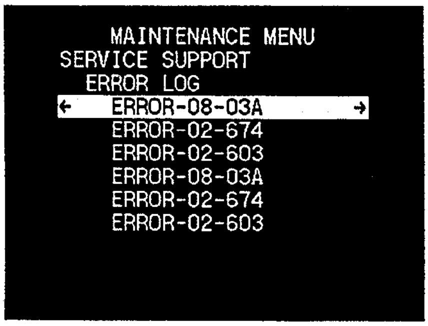
```
    MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

2. Set the cursor to SERVICE SUPPORT with the $\boxed{\uparrow}$ or $\boxed{\downarrow}$ button.
   Then, press the $\boxed{\rightarrow}$ button.



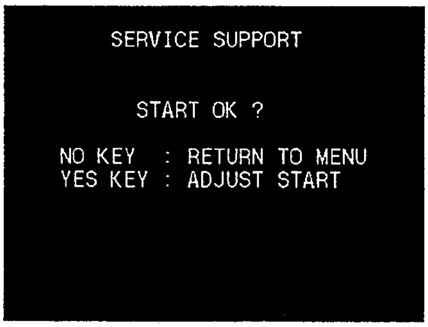
```
    MAINTENANCE MENU
SERVICE SUPPORT
← ERROR LOG                  →
  ERROR DIAGNOSTICS
  DEVICE DIAGNOSTICS
  MANUAL EJECT
```

3. Set the cursor to ERROR LOG with the ↑ or ↓ button.
   Then, press the → button.



```
     MAINTENANCE MENU
 SERVICE SUPPORT
   ERROR LOG
←     ERROR-08-03A          →
      ERROR-02-674
      ERROR-02-603
      ERROR-08-03A
      ERROR-02-674
      ERROR-02-603
```

4. Set the cursor to the desired error code with the ↑ or ↓ button.
   Then, press the → button.

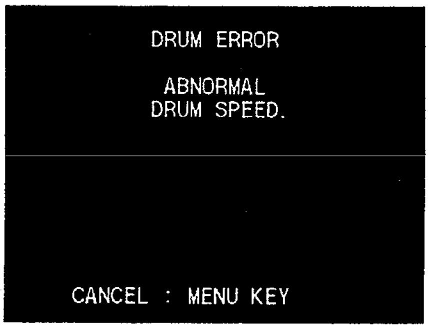


```
      SERVICE SUPPORT

        START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```

5. Press the SET (YES) button.



```
        DRUM ERROR

         ABNORMAL
        DRUM SPEED.



 CANCEL : MENU KEY
```

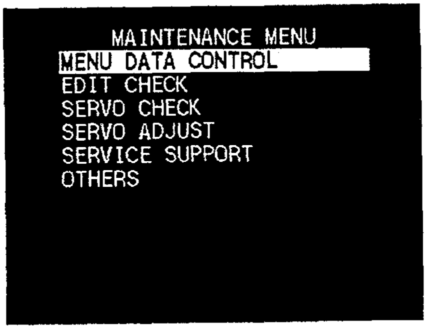
6. Press the MENU button. The display will return to Step 3.

3. How to look up an error code in this unit

This unit features a dictionary function to look up an error code.

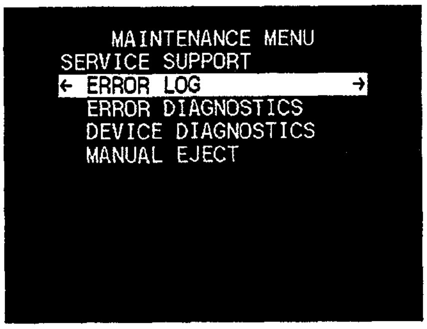
The procedures for looking up an error code are as follows:

1. Press the MENU button while pressing the [←] button.



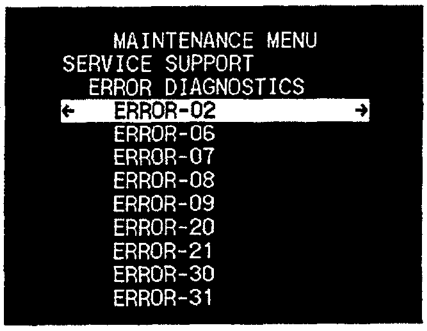
```
      MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

2. Set the cursor to SERVICE SUPPORT with the [↑] or [↓] button.
   Then, press the [→] button.



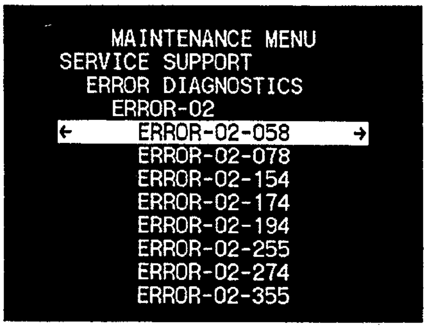
```
      MAINTENANCE MENU
SERVICE SUPPORT
← ERROR LOG                    →
  ERROR DIAGNOSTICS
  DEVICE DIAGNOSTICS
  MANUAL EJECT
```

3. Set the cursor to ERROR DIAGNOSTICS with the [↑] or [↓] button.
   Then, press the [→] button.



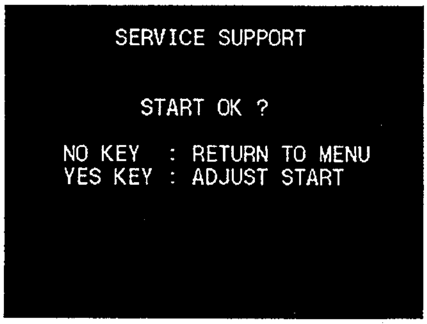
```
      MAINTENANCE MENU
SERVICE SUPPORT
  ERROR DIAGNOSTICS
←   ERROR-02                   →
    ERROR-06
    ERROR-07
    ERROR-08
    ERROR-09
    ERROR-20
    ERROR-21
    ERROR-30
    ERROR-31
```

4. Set the cursor to the error main code you wish to search with the ↑ or ↓ button.
   Then, press the → button.



```
    MAINTENANCE MENU
SERVICE SUPPORT
  ERROR DIAGNOSTICS
    ERROR-02
←     ERROR-02-058       →
      ERROR-02-078
      ERROR-02-154
      ERROR-02-174
      ERROR-02-194
      ERROR-02-255
      ERROR-02-274
      ERROR-02-355
```

5. Set the cursor to the error code you wish to search with the ↑ or ↓ button.
   Then, press the → button.

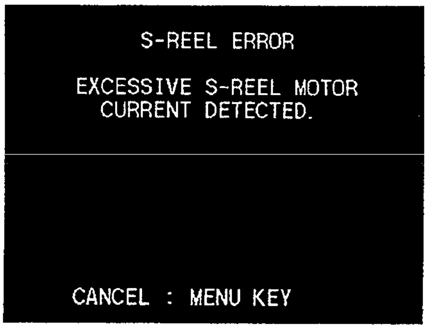


```
    SERVICE SUPPORT

      START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```

6. Press the SET (YES) button.



```
     S-REEL ERROR

 EXCESSIVE S-REEL MOTOR
   CURRENT DETECTED.



 CANCEL : MENU KEY
```

7. Press the MENU button. The display will return to Step 4.

4. Error code

- **Main code 0X : Servo system or tape path system problem**

① Main code 02

Sub code	Detection	Operation after detection	Valid mode	Display
058	It is detected that the current of the S reel motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
078	It is detected that the current of the T reel motor is not normal.			
154	The S reel FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	——	
174	The T reel FG cannot be detected by FG check when inserting a cassette tape.			
194	Neither S reel FG nor T reel FG can be detected by FG check when inserting a cassette tape.			
255	The S reel FG is detected in threading.	AUTO OFF	EJECT (Emergency EJECT)	
274	The T reel FG cannot be detected in threading.			
355	The S reel FG is detected in STOP or STILL mode.			
375	The T reel FG is detected in STOP or STILL mode.			
395	The S reel FG and T reel FG are detected in STOP or STILL mode.			
402	It is detected that the tape does not run at the specified speed in F. FWD or REW mode.	STOP	Error is remedied, then the unit operates normally.	Displays until pressing any button.
403	The slack of the tape is detected in F. FWD or REW mode.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
454	The S reel FG cannot be detected in F. FWD or REW mode.			
474	The T reel FG cannot be detected in F. FWD or REW mode.			
494	Neither S reel FG nor T reel FG can detected in F. FWD or REW mode.			
496	It is detected that the rotations of S and T reel are not normal in F. FWD or REW mode.			
503	The slack of the tape is detected in SEARCH mode.			
554	The S reel FG cannot be detected in SEARCH mode.			
574	The T reel FG cannot be detected in SEARCH mode.			

<table>
<tr><th>Sub code</th><th>Detection</th><th>Operation after detection</th><th>Valid mode</th><th>Display</th></tr>
<tr><td>594</td><td>Neither S reel FG nor T reel FG can be detected in SEARCH mode.</td><td rowspan="10">AUTO OFF</td><td rowspan="10">EJECT
(Emergency EJECT)</td><td rowspan="10">Displays until pressing any button or until inserting a cassette tape again.</td></tr>
<tr><td>596</td><td>It is detected that the rotations of S and T reel are not normal in SEARCH mode.</td></tr>
<tr><td>603</td><td>The slack of the tape is detected in PLAY or REC mode.</td></tr>
<tr><td>654</td><td>The S reel FG cannot be detected in PLAY or REC mode.</td></tr>
<tr><td>674</td><td>The T reel FG cannot be detected in PLAY or REC mode.</td></tr>
<tr><td>694</td><td>Neither S reel FG nor T reel FG can be detected in PLAY or REC mode.</td></tr>
<tr><td>696</td><td>It is detected that the rotations of S reel and T reel are not normal in PLAY or REC mode.</td></tr>
<tr><td>803</td><td>The slack of the tape is detected when unthreading.</td></tr>
<tr><td>855</td><td>The S reel FG is detected when unthreading.</td></tr>
<tr><td>874</td><td>The T reel FG cannot be detected when unthreading.</td></tr>
<tr><td>A55</td><td>The S reel FG is detected during removal of a cassette tape.</td><td colspan="3" rowspan="3">Until the error is remedied, inhibits inserting a cassette tape.</td></tr>
<tr><td>A75</td><td>The T reel FG is detected during removal of a cassette tape.</td></tr>
<tr><td>A95</td><td>The S reel FG and T reel FG are detected during removal of a cassette tape.</td></tr>
</table>

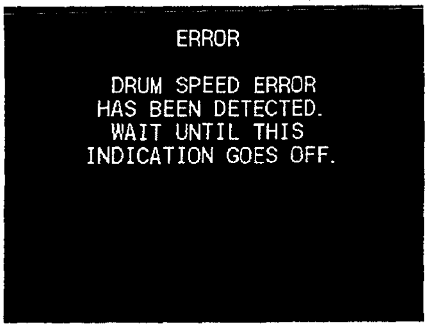
② Main code 06

Sub code	Detection	Operation after detection	Valid mode	Display
6A7	It is detected that the tape tension is not normal in PLAY or REC mode.	Continues operating in the mode in which the problem is detected. When enters other than PLAY or REC mode, AUTO OFF.	The error is remedied, then the unit operates normally. In PLAY or REC mode : Continues operating. In other than PLAY or REC mode : STOP, then EJECT (emergency EJECT)	Displays until the error is remedied and pressing any button.

③ Mail code 07

Sub code	Detection	Operation after detection	Valid mode	Display
042	It is detected that the speed of the capstan is not normal.	STOP	The error is remedied, then the unit operates normally.	Displays until pressing any button.
144	The capstan FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	——	Displays until inserting a cassette tape again.

④ Main code 08

Sub code	Detection	Operation after detection	Valid mode	Display
03A	It is detected that the speed of the drum is not normal.  ERROR DRUM SPEED ERROR HAS BEEN DETECTED. WAIT UNTIL THIS INDICATION GOES OFF.	RETRY (Once unthreading, then threading again.)	EJECT	Displays until the error is remedied.
032	The drum speed problem is not remedied.	AUTO OFF	EJECT	Displays until inserting a cassette tape again.

⑤ Main code 09

Sub code	Detection	Operation after detection	Valid mode	Display
028	It is detected that the current of the threading motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
209	When detects full top or end of a tape in the threading state and then performs SHORT FF/SHORT REW, top or end is not released.	Removes cassette tape automatically.	——	
221	Threading is not completed within the specified time.	AUTO OFF	EJECT (Emergency EJECT)	
821	Unthreading is not completed within the specified time.			

- **Main code 2X : Mechanical control system problem**

① Main code 20

Sub code	Detection	Operation after detection	Valid mode	Display
018	It is detected that the current of the cassette up/down motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
111	The operation of cassette down is not completed within the specified time.	Removes cassette tape automatically.	——	
911	The operation of cassette up is not completed within the specified time.	AUTO OFF	Inhibits all modes.	

② Main code 21

Sub code	Detection	Operation after detection	Valid mode	Display
0C8	It is detected that the current of the reel position motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
1C1	The driving of the reel position is not completed within the specified time.	Removes cassette tape automatically.	——	

- **Main code 3X : Sensors problem**

The sub code of the main code 3X is 000.

Main code	Detection	Operation after detection	Valid mode	Display
30	Tape-top and tape-end are detected at the same time.	STOP	PLAY, EJECT	Displays until an error is clear up.
31	Tape-top is not released.	STOP	PLAY, FF, EJECT	
32	Tape-end is not released.	STOP	PLAY, REW, EJECT	
33	The reel position sensor detects the L position and S position at the same time.	Inhibits inserting a cassette tape.		

- **Main code 9X : Communication and interface systems problem**

Main code	Sub code	Detection
91	125	The interface problem between system control and keyboard is detected.
	138	Problem on the hours meter data of EEPROM is detected.
	145	The initialization problem between system control and servo is detected.
	165	The interface problem between system control and TBC is detected.
	436	Problem on the servo adjustment data of EEPROM is detected.
	455	The interface problem between main servo and sub servo is detected.
92	000	1/2 VD signal with input to system control cannot be detected.
93	000	Servo reference sync signal cannot be detected.
94	000	Servo input sync signal cannot be detected.

5. Probable cause of the error code

- Probable cause of the error code

Main code	02												06
Sub code Probable cause	403 503 603	574 674 803	554 654	402 454 474	355 375	058 078	154 174 194 255 855 A55 A75 A95	274 874	594 694	494	395	496 596 696	6A7
1. Tape clings to tape path system.	○	○	○	○				○		○			○
2. Tape winds in disorder.	○	○	○	○	○						○	○	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	○	○	○	○				○	○	○	○	○	
4. Reel motor does not generate the specified torque.	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Reel FG is defective.	○	○	○	○	○		○	○	○	○	○	○	○
6. Tension regulator is defective.	○												
7. The splice tape is used.		○	○		○				○		○	○	
8. Tape top/end sensors are defective			○	○					○	○			○
9. Insufficient pinch roller pressure									○			○	

- How to check the probable cause, board and devices

Probable cause	How to check	Board, devices
1. Tape clings to tape path system. • Dirt on the tape • Dirt on the tape path system • HUMID	• Check that the tape clings to tape path system and drum or not. • Check that something attaches to the tape or not. • Check that any scratch is on the tape or not. • Check that something attaches to tape path system or not.	
2. Tape winds in disorder • Worn tape is used. • Scratched tape is used.	• Check that the tape winds in disorder.	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	All four pins on the cassette compartment should be inserted to the holes on the slant table. The cassette compartment stainer should be installed securely. ↓ When the cassette compartment is shaky in inserting a cassette tape, replace the cassette compartment with a new one. ↓ When the cassette compartment is not shaky, the cassette compartment is defective. When it is shaky, drive circuit is defective.	DR-214 board, MS-39 board
4. Reel motor does not generate the specified torque. • Mechanic of reel brake is defective. • Reel brake solenoid is cut. • Drive IC of reel brake solenoid is defective. • Reel motor is defective. • Drive circuit of reel motor is defective. • Harness is defective.	• When S/T reel brake is suspected cause: Perform the S/T reel brake check. S/T reel brake must be released. • When S/T reel motor is suspected cause: Perform the reel FG adjustment. The adjustment must be completed normally.	When S reel brake is suspected cause: DR-214 board, MS-39 board, RM-126 board, S reel brake solenoid When T reel brake is suspected cause: DR-214 board, MS-39 board, RM-127 board, T reel brake solenoid When S reel motor or S reel FG is suspected cause: SS-61 board, DR-214 board, MS-39 board, RM-126 board, SE-207 board, S reel motor, S reel FG sensor GP1A30R When T reel motor or T reel FG is suspected cause: SS-61 board, DR-214 board, MS-39 board, RM-127 board, SE-207 board, T reel motor, T reel FG sensor GP1A30R
5. Reel FG is defective. • Photo sensor of reel FG is defective. • Harness is defective.	Perform the reel FG adjustment. The adjustment must be completed normally.	
6. Tension regulator is defective.	Perform the hook position adjustment. The display must be OK.	TR-84 board, MS-39 board, DR-214 board, SS-61 board, Tension sensor DM230
7. The splice tape is used.		

Probable cause	How to check	Board, devices
8. Tape top/end sensors are defective.	Perform the tape top/end check. The tape top/end sensors must be turning on or off normally.	When tape top sensor is suspected cause: PTC-67 board, MS-39 board, DR-214 board, SS-61 board, Tape top sensor When tape end sensor is suspected cause: PD-35 board, MS-39 board, DR-214 board, SS-61 board, tape end sensor
9. Insufficient pinch roller pressure • Mechanic of pinch roller is defective. • Pinch solenoid is cut. • Drive IC of pinch solenoid is defective.	Perform the pinch roller check. The pinch roller must be pressed to capstan shaft surely.	PD-35 board, MS-39 board, DR-214 board, Pinch solenoid

3-5. PRINTED CIRCUIT BOARD

SYSTEM	BOARD	CIRCUIT FUNCTION	UVW-1700GP	UVW-1400AP
VIDEO	CP-262	Video Input/Output Connector	○	
	CP-262A	Video Input/Output Connector		○
	VRA-7P	Input Video Selector, Y/C Separator, CTDM (Compressor), Y/C FM Modulator	○	
	RP-70P	RF REC/PB Amplifier, Rotary/Full Erase Oscillator	○	
	RP-70BP	RF REC/PB Amplifier, Full Erase Oscillator		○
	VP-44P	Y/C PB Process (PB RF Equalizer, Demodulator, Encoder, Drop-out Detector), Video Output Driver	○	○
	TBC-28P	Time Base Corrector, CTDM (Expander)	○	○
AUDIO	CP-226	Audio Input/Output Connector	○	○
	CP-262	Monitor Out	○	
	CP262A	Monitor Out		○
	VR-155	REC Level Control	○	○
	AR-14AP	Audio REC Amplifier, LTC REC Amplifier, Audio Bias	○	○
	AP-31BP	Audio PB Amplifier, LTC PB Amplifier, Meter Amplifier	○	○
	HP-61	Headphones Jack/Level Control, SIRCS Remote Control Jack	○	○
	AH-46	Audio Head	○	○
SERVO/ SYSTEM CONTROL/ TIME CODE	SS-61	System Control, Servo System Control, Time Code Generator/Reader, Character Generator	○	○
	KY-290	Function Key	○	○
	DR-214	Motor Driver, Sensor Input Amplifier, Tension Sens. Amplifier, Drum FG/PG Amplifier, Capstan FG Amplifier, CTL REC/PB Amplifier, TAPE TOP/END DETECT	○	○
	MS-39	Cassette-in Sensor, Miss-rec Sensor, Solenoid Driver, Adjust Data Storage	○	○
	CL-29	Cassette Compartment (Cassette Loading Begin/Near-end Sensor, PC-70/LP-57 Connection)	○	○
	SE-207	Reel FG Sensor	○	○
	PD-35	Pinch Solenoid	○	○
	PC-70	Cassette In/Large Cassette Sensor	○	○
	TR-84	Tension Regulator Sensor	○	○
	PTC-66	Reel Position Sensor	○	○
	PTC-67	Threading Motor, Threading FG Sensor	○	○
	PTC-68	Thread End/Unthread End Sensor	○	○
	RM-126	Supply Reel Motor	○	○
	RM-127	Take-up Reel Motor	○	○
	RM-157	REMOTE / REMOTE 2 Jack		○
	CP-261	REMOTE 25P/9P Connector	○	
	CP-261A	REMOTE 25P Connector		○
	CP-262	REMOTE Jack	○	
OTHERS	MB-604P	Mother Board for SS-61A, TBC-28P, VP-44P and VRA-7P Boards	○	○
	MB-471	Mother Board for RP-70, AP-31B and AR-14AP Boards	○	
	MB-471B	Mother Board for RP-70BP, AP-31BP and AR-14AP Boards		○

SONY®

SONY - SP0362

VIDEOCASSETTE RECORDER

UVW-1700GP
UVW-1400AP

SERVICE MANUAL

Vol.1 1st Edition

BETACAM SP

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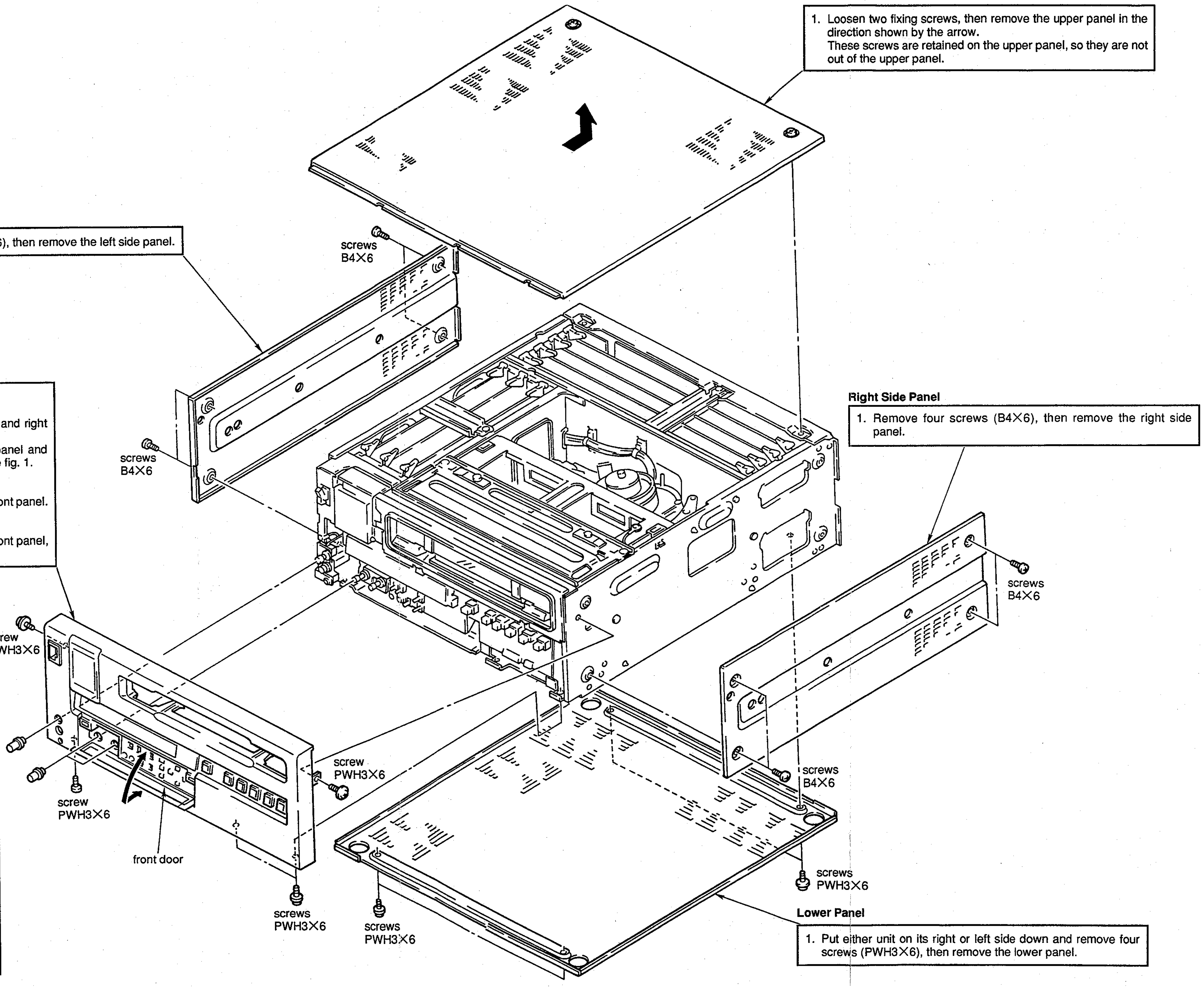
3-6. REMOVAL OF THE CABINET

Make sure to turn the power off before removing the cabinets.


screws
B4X6
screws
B4X6
screws
B4X6
screw
PWH3X6
screw
PWH3X6
screw
PWH3X6
front door
screws
PWH3X6
screws
PWH3X6
screws
B4X6
screws
PWH3X6

Upper Panel

1. Loosen two fixing screws, then remove the upper panel in the direction shown by the arrow.
   These screws are retained on the upper panel, so they are not out of the upper panel.

Left Side Panel

1. Remove four screws (B4×6), then remove the left side panel.

Front Panel

1. Remove the upper panel.
2. Remove three control knobs.
3. Remove the each one screw (PWH3×6) at the left and right side and three screws (PWH3×6) at the bottom.
   Insert your fingers in the place between the front panel and chassis, then remove the front panel as shown in the fig. 1.

Note for removal
Make sure to close the front door, then remove the front panel.

Note for installation
Make sure to lower the SLIDE SWITCH inside the front panel, then install the front panel.

Right Side Panel

1. Remove four screws (B4×6), then remove the right side panel.

Lower Panel

1. Put either unit on its right or left side down and remove four screws (PWH3×6), then remove the lower panel.

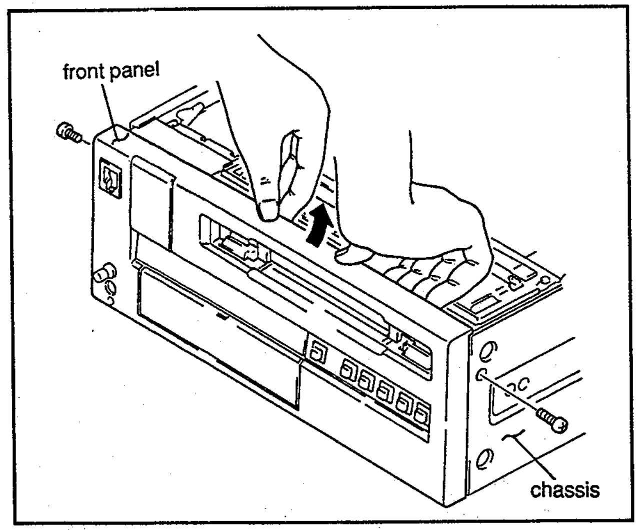

front panel
chassis

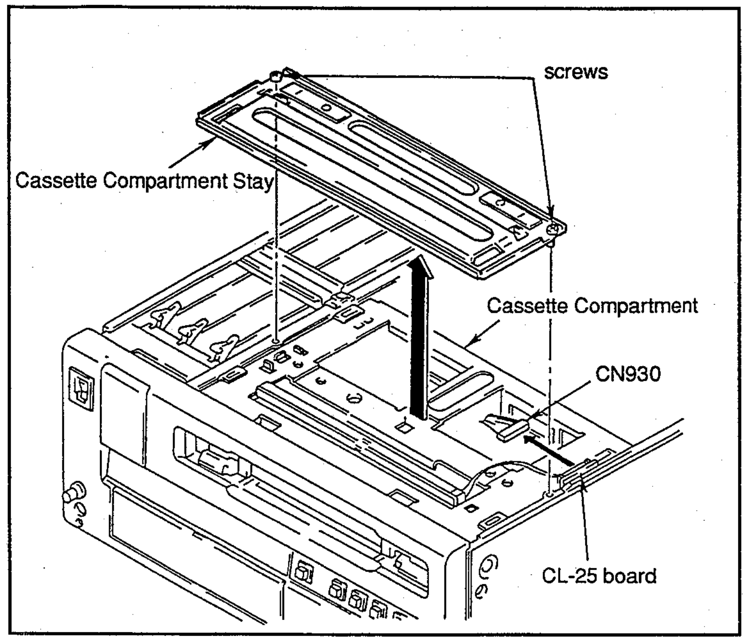
Fig. 1

3-7. REMOVAL/INSTALLATION OF CASSETTE COMPARTMENT

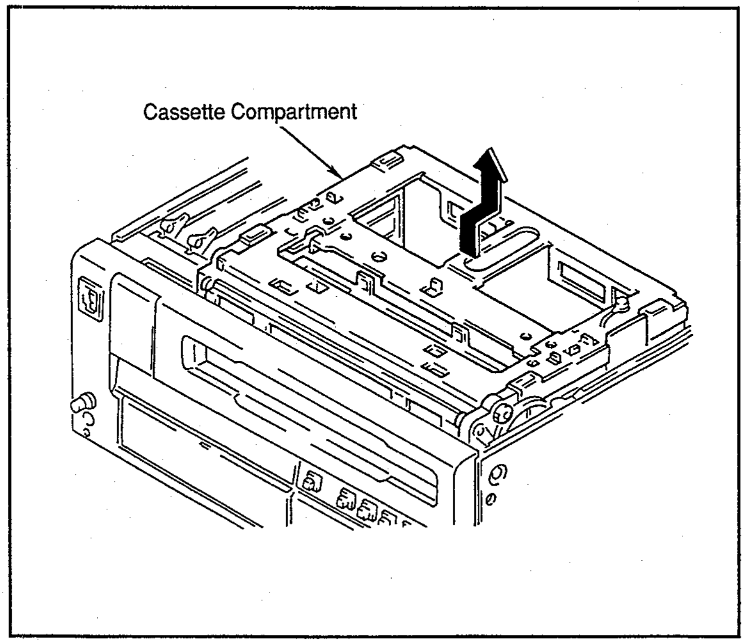
Make sure to turn the power off before removing the cabinets.

Removal

1. Remove the upper panel (Refer to Section 3-6.).
2. Loosen the two screws as shown in the figure, then remove the cassette compartment stay.
   These screws are retained on the stay, so they aren't out of the stay.
3. Disconnect the connector (CN930) on the CL-25 board at the upper right of the cassette compartment.


screws
Cassette Compartment Stay
Cassette Compartment
CN930
CL-25 board

4. Lift up the cassette compartment a little. Remove it with sliding it horizontally shown in the direction of the arrow.

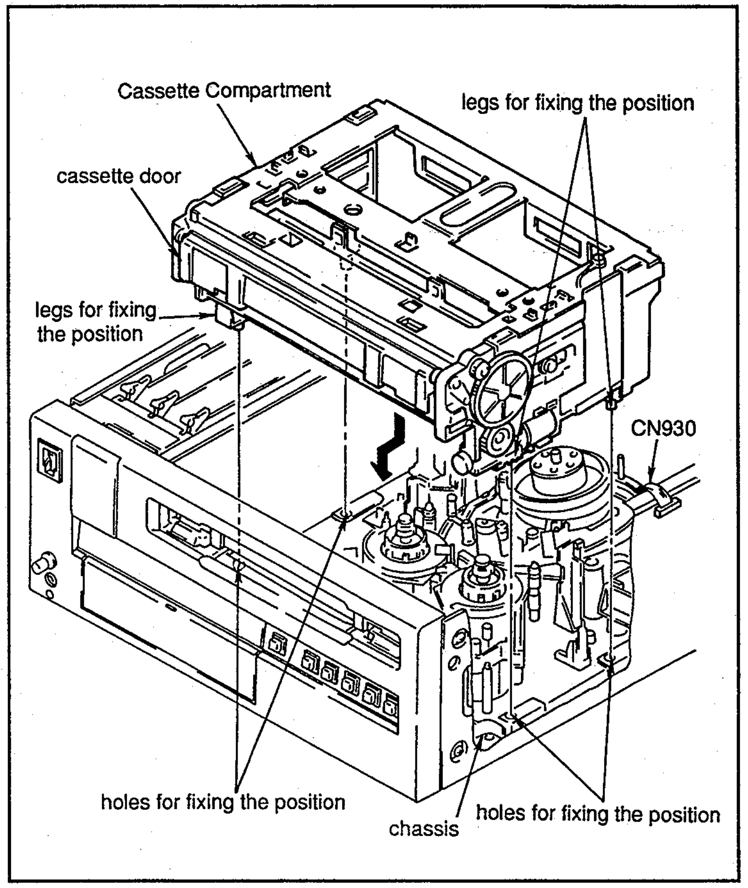

Cassette Compartment

Installation

5. Set the harness of the connector (CN930) disconnected in step (3), so it isn't put between the chassises.
   Install the cassette compartment in the reverse order of step 4.

   Note : At this time, confirm that the four legs of the cassette compartment for fixing the position are in the holes of the chassis for fixing the position.

6. After confirming that the cassette compartment is fixed to the chassis, install the cassette compartment stay and connect the connector (CN930) of the CL-25 board.


Cassette Compartment
legs for fixing the position
cassette door
legs for fixing the position
CN930
holes for fixing the position
chassis
holes for fixing the position

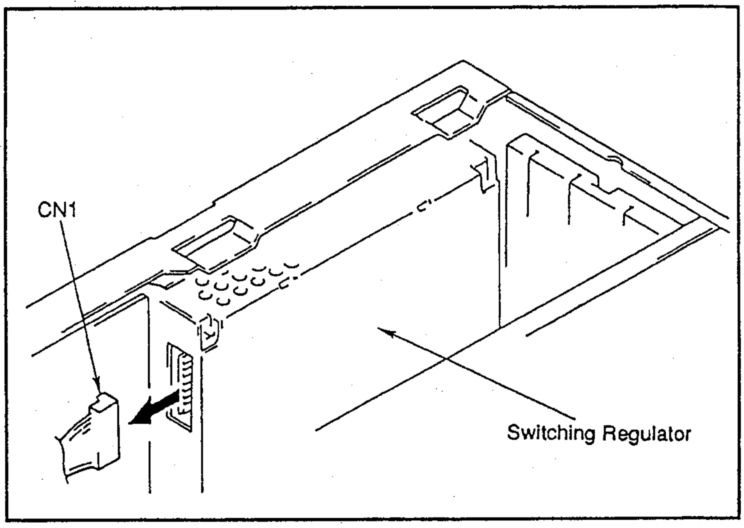
3-8. REMOVAL OF THE SWITCHING REGULATOR

Note :

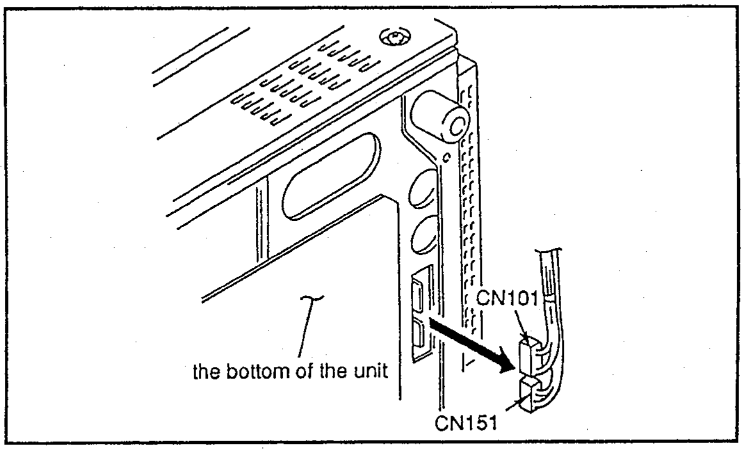
The switching regulator is primary side circuit. Take precaution and avoid electric shock when removing the switching regulator for replacement or another reason. **There is possibility of an electric shock even when the power is turned off.** Be sure to remove following more than 10 minutes after the power is turned off.

1. Remove the upper panel (Refer to Section 3-6.), then remove the VRA-7, VP-44 and TBC-28 boards (Refer to Section 3-11-11.).

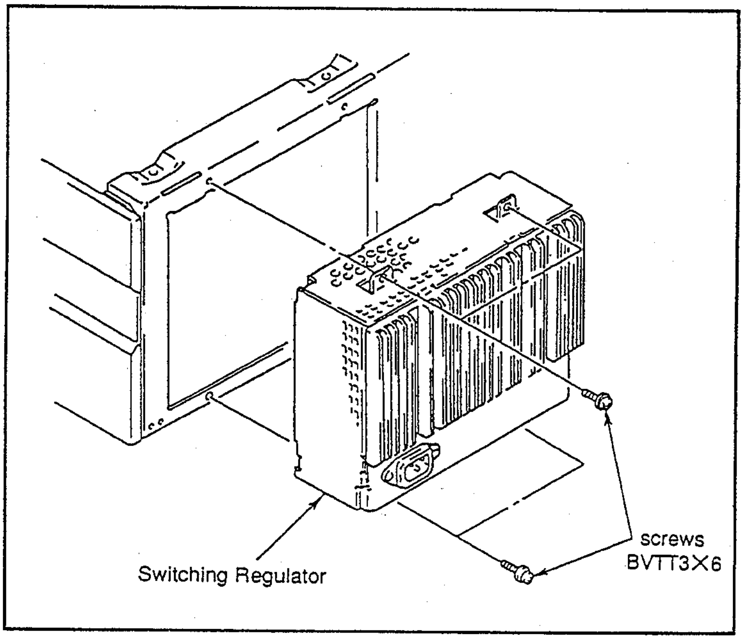
2. Disconnect the connector (CN1) of the SOPS-1045 M <for NTSC> / SOPS-1046 M <for PAL> board (Inside the switching regulator).



3. Remove the lower panel (Refer to section 3-6.) and disconnect the two connectors (CN101, CN151) of the SOPS-1045 AC <for NTSC> / SOPS-1046 AC <for PAL> board (Inside the switching regulator).



4. Remove four screws, then remove the switching regulator.

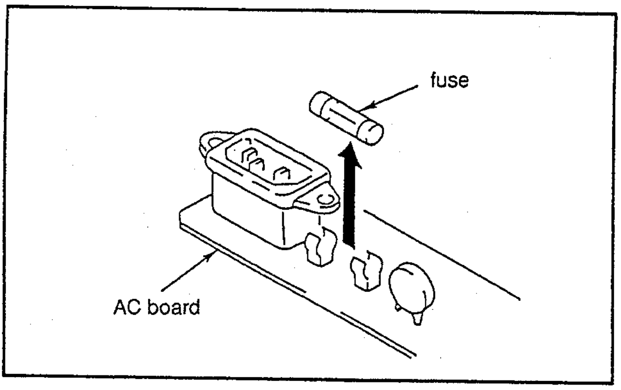


3-9. REPLACEMENT OF FUSE

Note :
A power fuse is mounted on the SOPS-1045 AC <for NTSC> / SOPS-1046 AC <for PAL> board of the switching regulator. When some troubles occur and an electric current flows excessively, the fuse is melted. If the fuse has blown, first remedy the cause of trouble, and then replace the fuse.

1. Remove the SOPS-1045 AC <for NTSC> / SOPS-1046 AC <for PAL> board (Refer to Section 3-11-11.).
2. Remove the fuse from the fuse holder, then replace it with a new one.

SONY PARTS NUMBER : 1-532-746-11 (4A, 125V)
<for NTSC>
1-576-228-11 (2A, 250V)
<for PAL>



3-10. EXTENSION BOARD

Two extension boards are supplied as optional accessory for check and adjustment of some printed circuit boards. Insert the extension board into the chassis of the unit and connect the circuit board to be checked or adjusted to the end of the extension board.

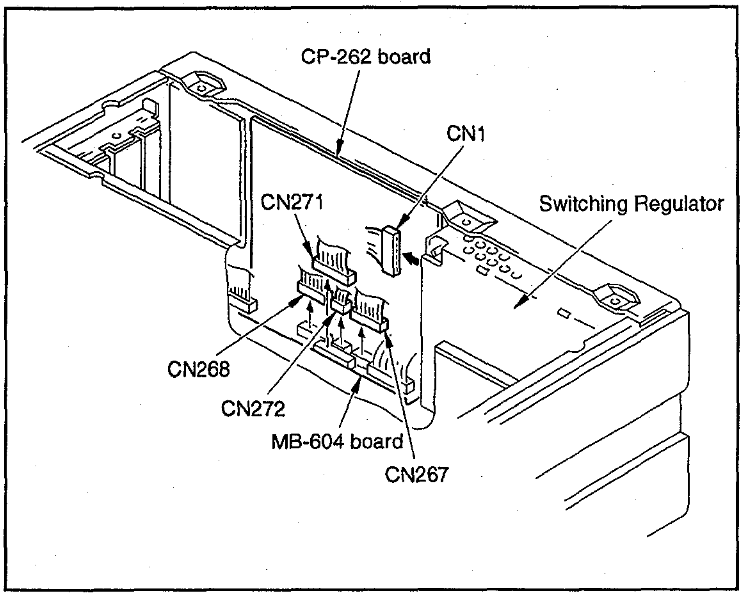
Extension board	Connectable Printed Circuit Boards
EX-278 J-6332-780-A	SS-61, TBC-28, VP-44,VRA-7
EX-279 J-6332-790-A	RP-70, AP-31, AR-14

3-11. REPLACEMENT OF THE BOARDS

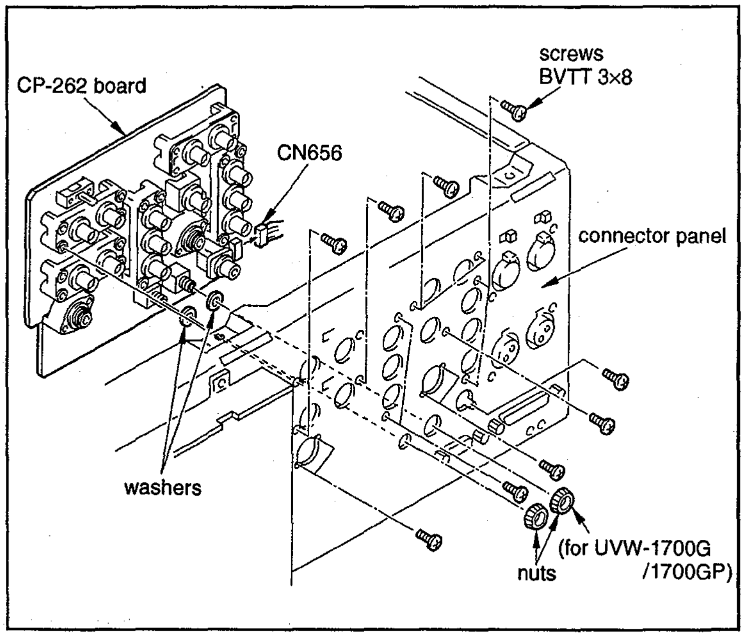
Make sure to turn the power off before removing the boards.

3-11-1. CP-262 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-61, TBC-28, VP-44 and VRA-7 boards (Refer to Section 3-11-11.).
3. Disconnect the four connectors (CN267, CN268, CN271, CN272) of the MB-604 board and the connector (CN1) of the SOPS-1046 M board (Inside the switching regulator).

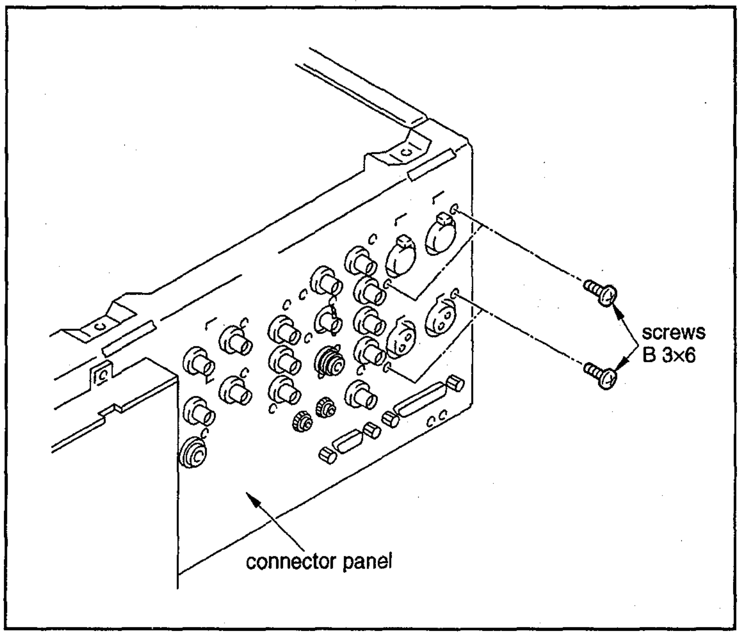

CP-262 board
CN1
CN271
Switching Regulator
CN268
CN272
MB-604 board
CN267

4. Remove sixteen screws (BVTT3×8), two washers and two nuts (UVW-1700G/1700GP has one each).
5. Disconnect the connector (CN656), then remove the CP-262 board.

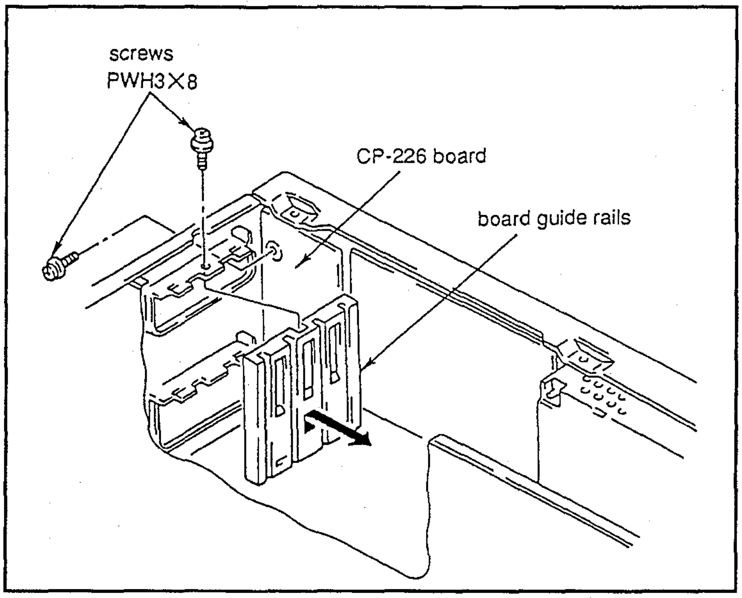

screws
BVTT 3x8
CP-262 board
CN656
connector panel
washers
nuts
(for UVW-1700G
/1700GP)

3-11-2. CP-226 Board

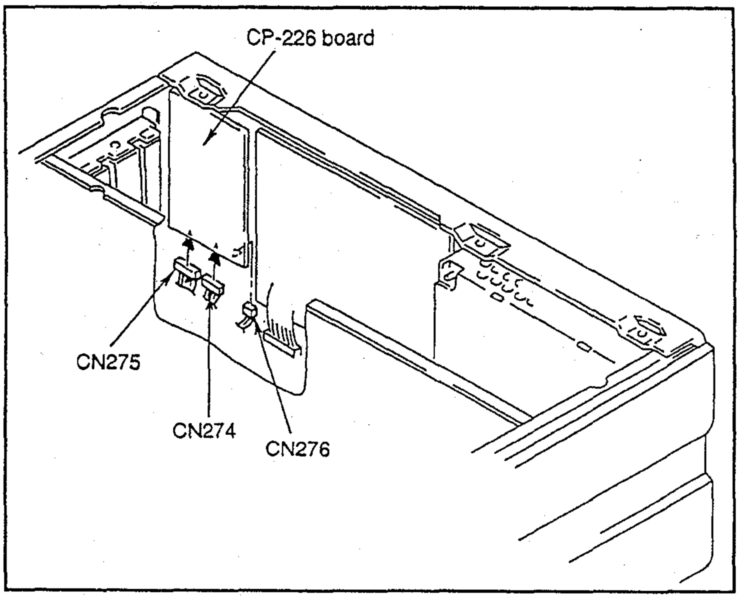
1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-61, TBC-28P, VP-44P and VRA-7 boards (Refer to Section 3-11-11.).
3. Remove the left side panel (Refer to Section 3-6.).
4. Remove four screws (B3 × 6).


screws
B 3x6
connector panel

5. Remove the screw (PWH3 × 8), then remove a board guide rails. Remove the screw (PHW3 × 8) from the side, then remove the board.

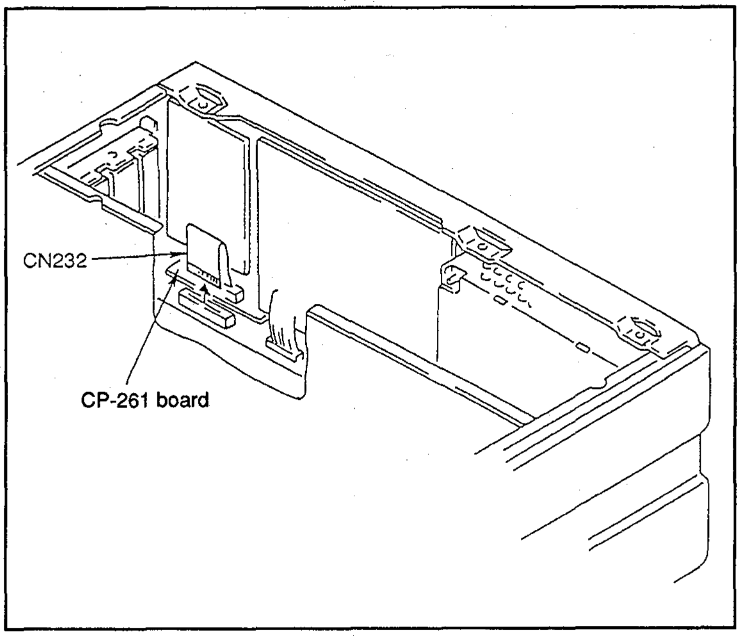

screws
PWH3X8
CP-226 board
board guide rails

6. Disconnect the three connectors (CN275, CN274, CN276) of the CP-226 board.

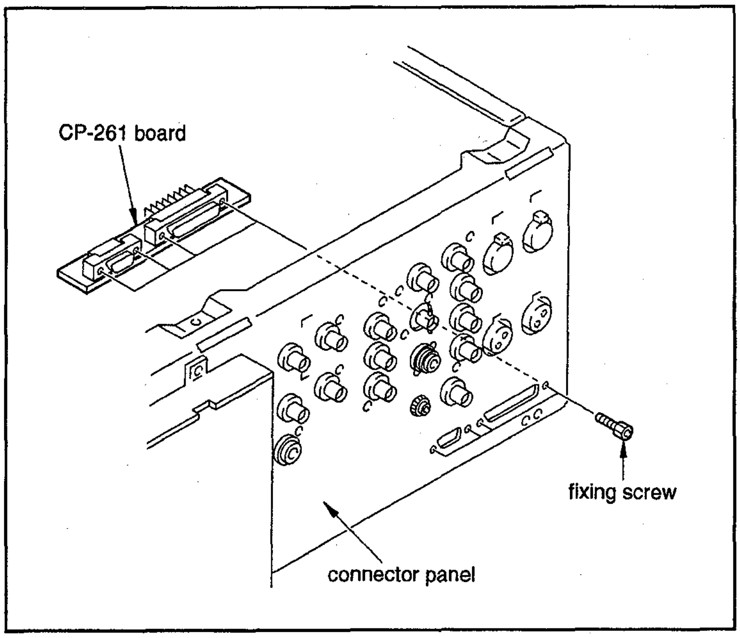

CP-226 board
CN275
CN274
CN276

3-11-3. CP-261 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the VRA-7, VP-44 and TBC-28 boards (Refer to Section 3-11-11.).
3. Disconnect the connector (CN232) of the MB-604 board.

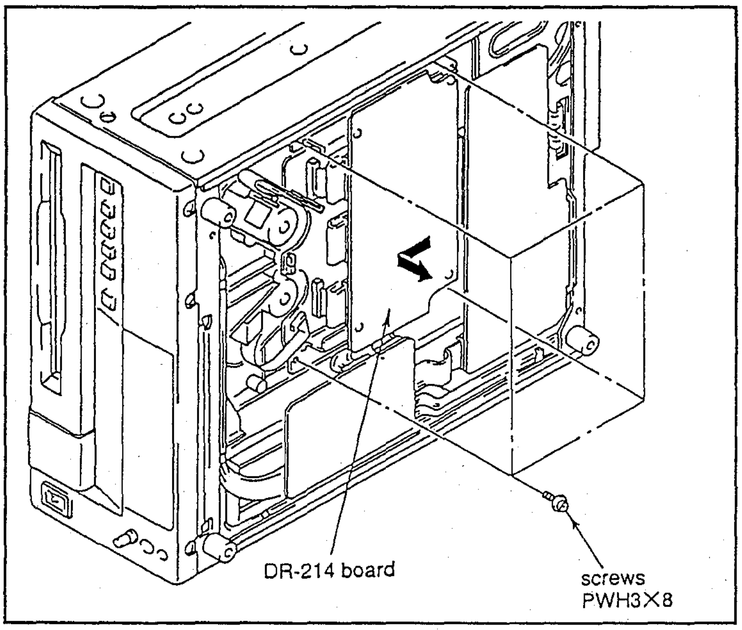

CN232
CP-261 board

4. Remove four (UVW-1700G/1700GP) or two (UVW-1400A/1400AP) fixing screws, then remove the board.

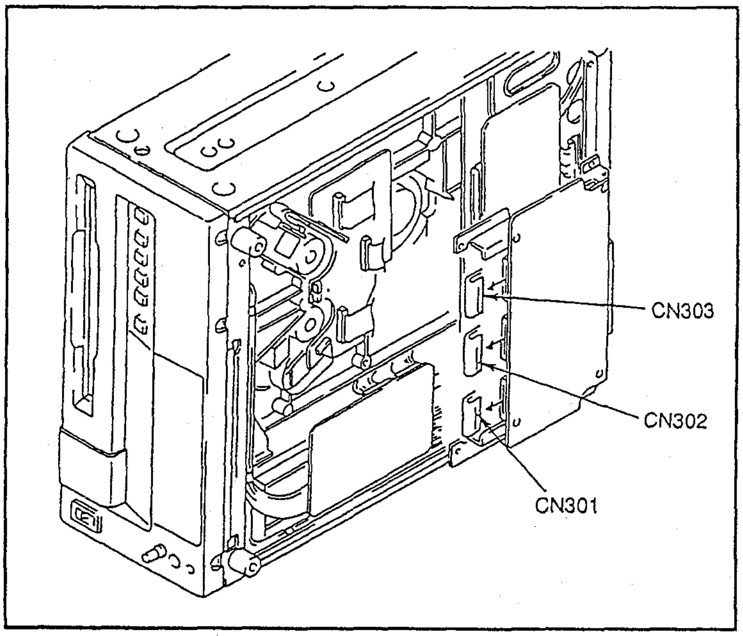

CP-261 board
fixing screw
connector panel

3-11-4. DR-214 Board

1. Remove the lower panel (Refer to Section 3-6.).
2. Remove four screws (PWH3×8), then remove the board in the direction shown by the arrow from the connector (CN214) of the MB-604 board.

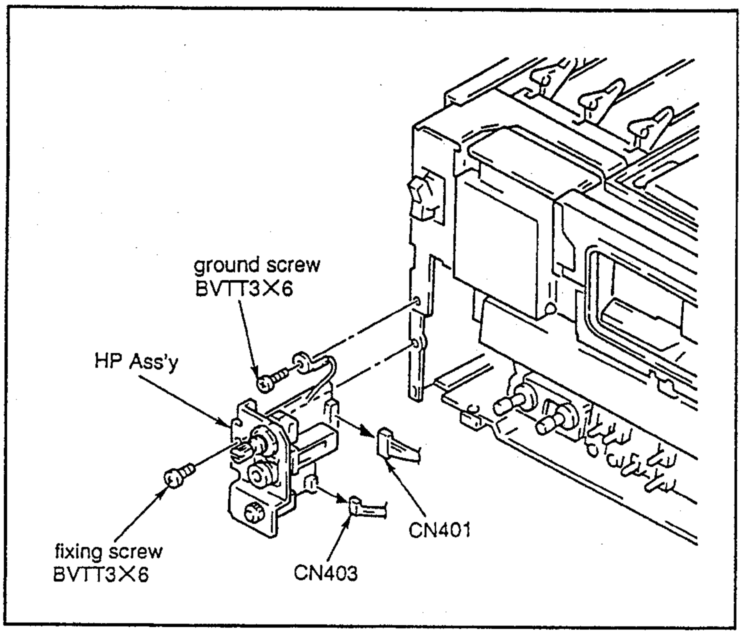

DR-214 board
screws
PWH3X8

3. Pull out the three flexible card wire (CN301, CN302, CN303) from the connector.

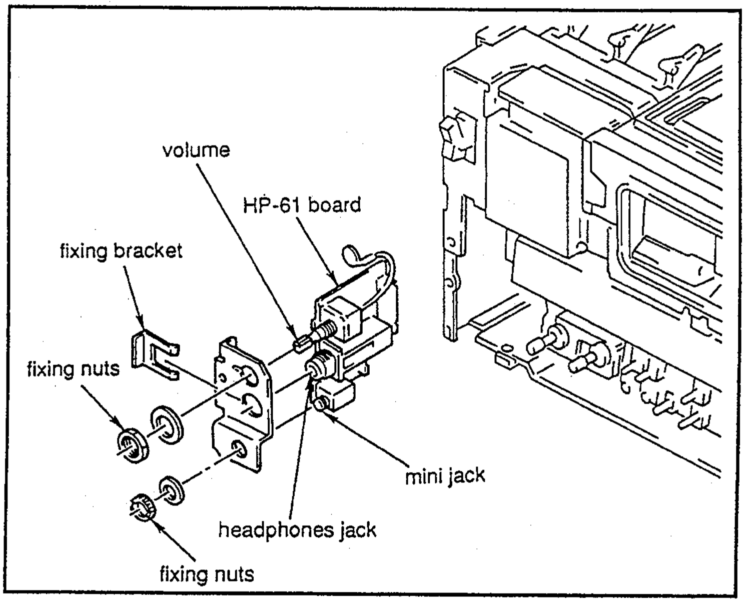

CN303
CN302
CN301

3-11-5. HP-61 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove the fixing screw (BVTT3×6) and the ground screw (BVTT3×6), then remove the HP Ass'y.
3. Disconnect the two connectors (CN401, CN403) of the HP-61 board.

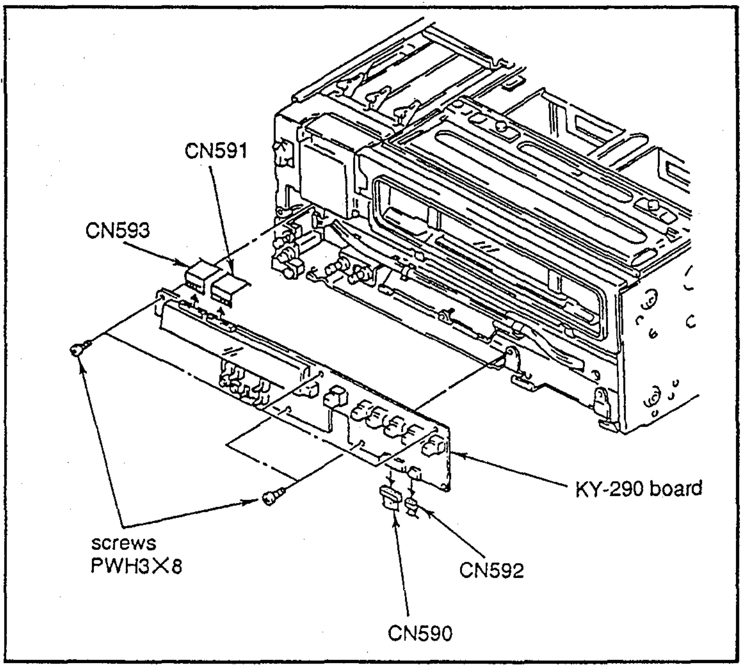

ground screw
BVTT3X6
HP Ass'y
CN401
fixing screw
BVTT3X6
CN403

4. Remove the fixing nuts of the mini jack.
5. Remove the volume fixing nuts.
6. Remove the fixing bracket of the headphones jack, then remove the board.


volume
HP-61 board
fixing bracket
fixing nuts
mini jack
headphones jack
fixing nuts

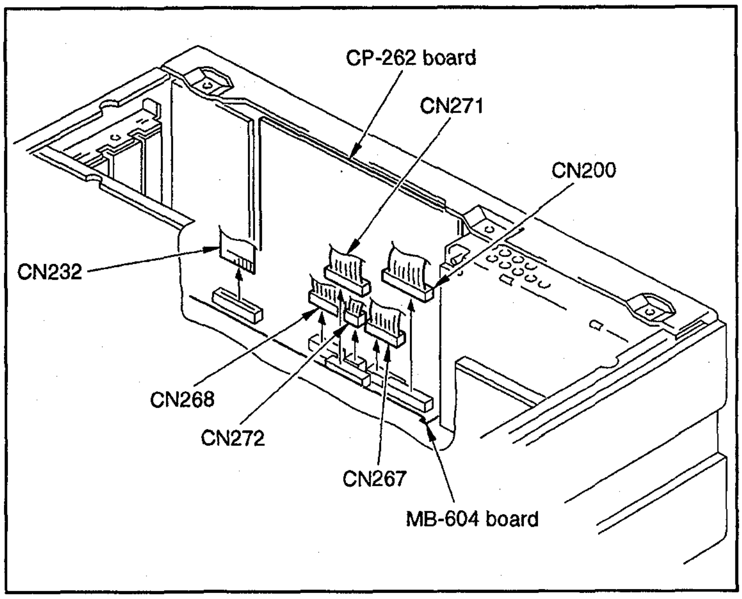
3-11-6. KY-290 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove the five screws (PWH3×8) of the KY-290 board.
3. Disconnect the two connectors (CN590, CN592) of the KY-290 board.
4. Pull out the flexible card wire from the connector.

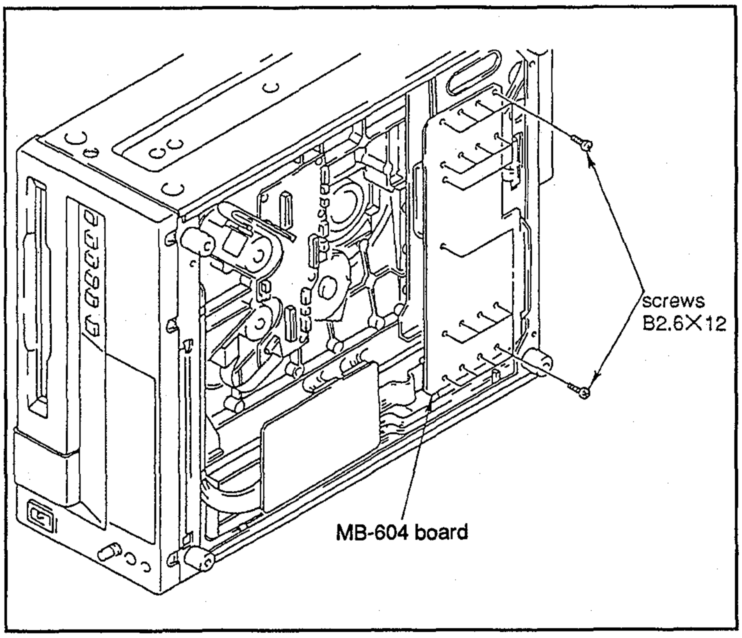

CN591
CN593
KY-290 board
screws
PWH3X8
CN592
CN590

3-11-7. MB-604 Board

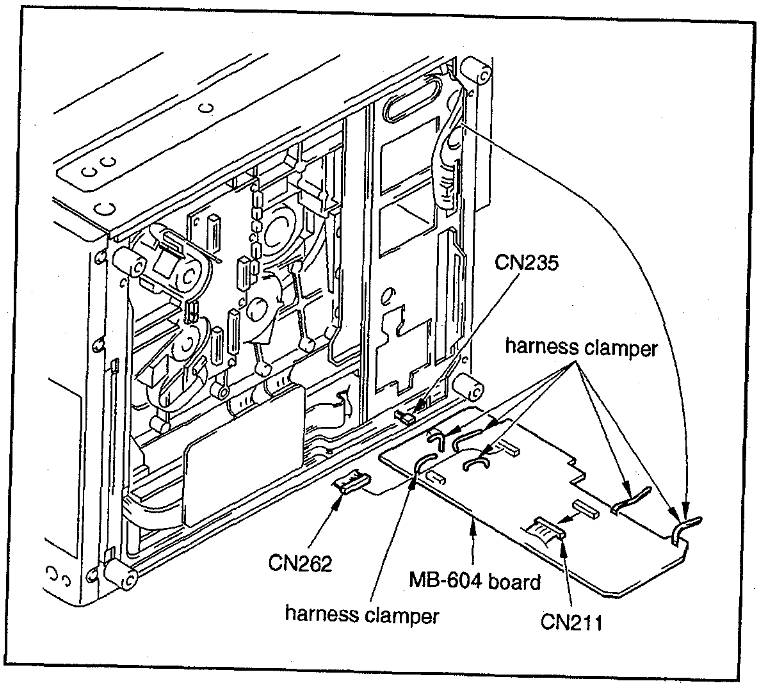
1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-61, TBC-28, VP-44 and VRA-7 boards (Refer to section 3-11-11.).
3. Disconnect the six connectors (CN200, CN232, CN267, CN268, CN271, CN272) of the MB-604 board.


CP-262 board
CN271
CN200
CN232
CN268
CN272
CN267
MB-604 board

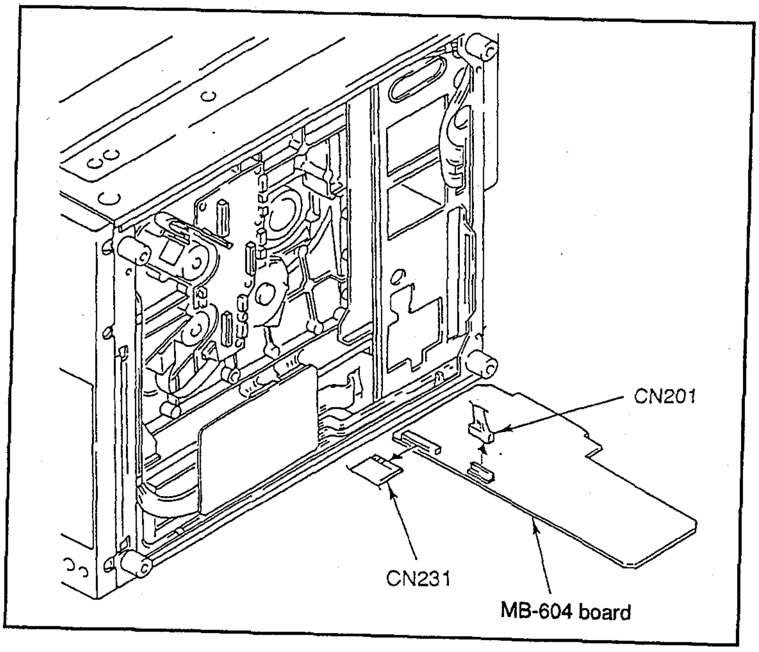
4. Remove the DR-214 board (Refer to Section 3-11-4.).
5. Remove the eighteen screws (B2.6×12) of the MB-604 board.


screws
B2.6×12
MB-604 board

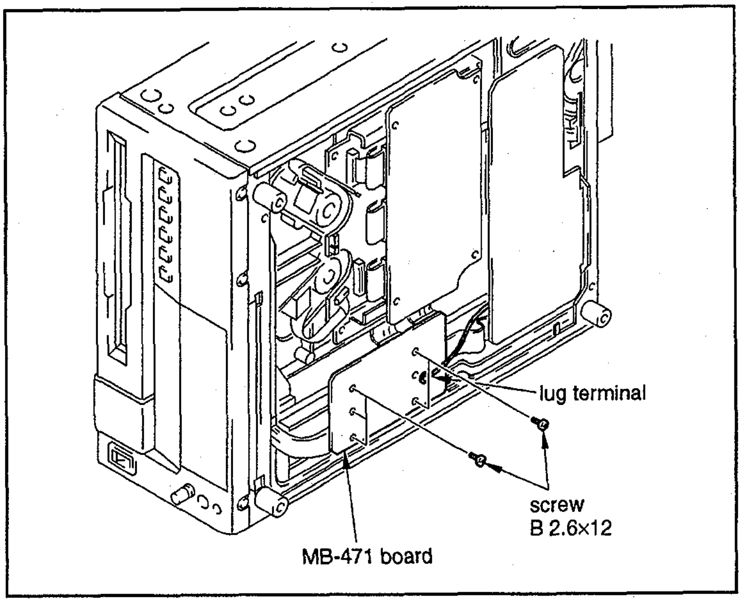
6. Open the MB-604 board and remove the six harness from the clamper, then disconnect the three connectors (CN211, CN235, CN262).


CN235
harness clamper
CN262
MB-604 board
harness clamper
CN211

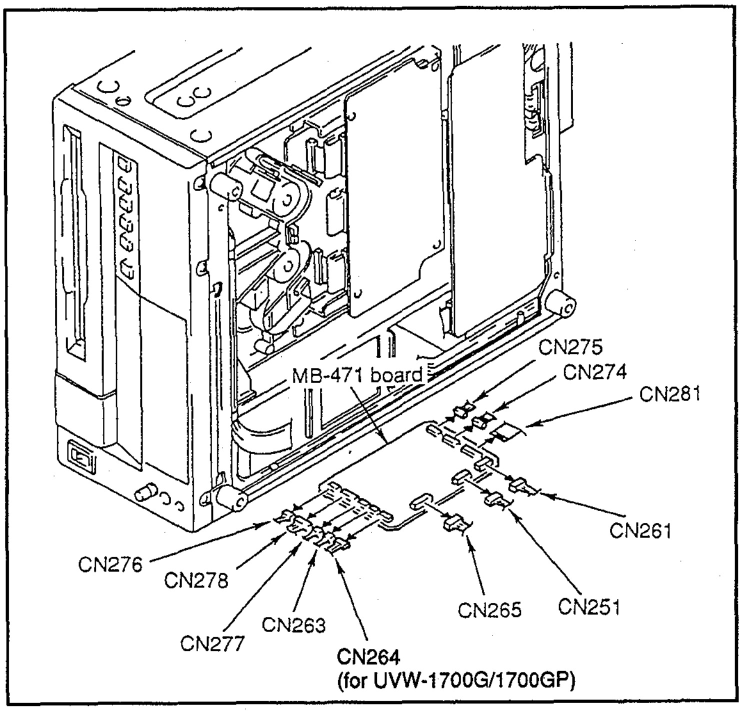
7. Disconnect the connector (CN201), and pull out the flexible card wire (CN231).


CN201
CN231
MB-604 board

3-11-8. MB-471 Board


lug terminal
screw
B 2.6x12
MB-471 board

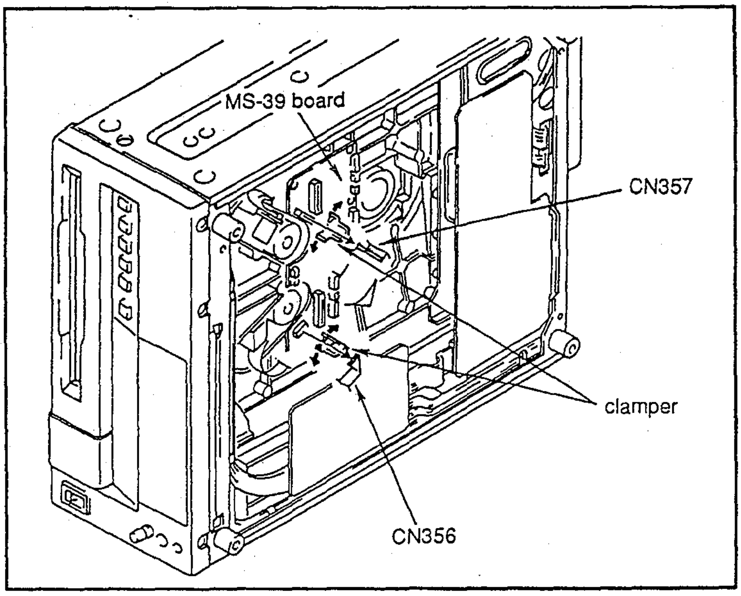
1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the AR-14, AP-31 and RP-70 boards (Refer to Section 3-11-11.).
3. Remove six screws (B2.6×12) and lug terminal of the MB-471 board.


CN275
CN274
MB-471 board
CN281
CN261
CN276
CN278
CN265
CN251
CN263
CN277
CN264
(for UVW-1700G/1700GP)

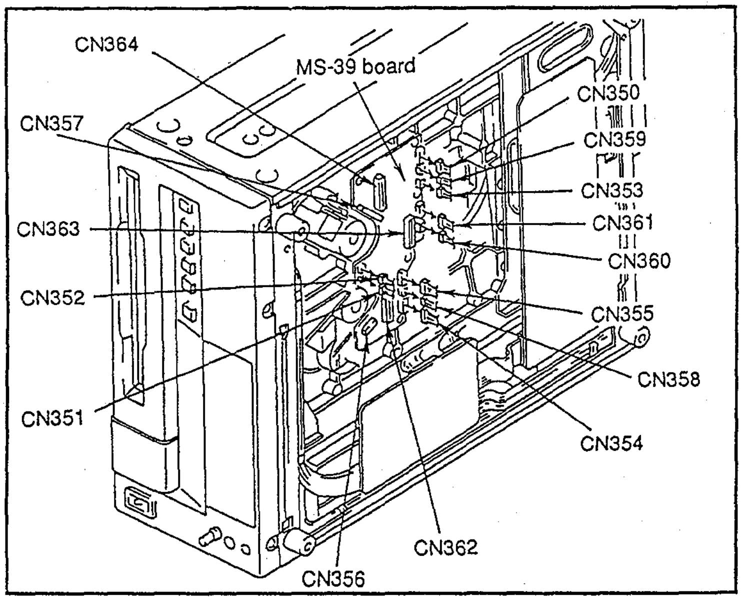
4. Pull out the flexible card wire from the connector.
5. Disconnect the ten connectors (CN251, CN261, CN263, CN264, CN265, CN274, CN275, CN276, CN277, CN278) of the MB-471 board.
   (CN264 is for UVW-1700G/1700GP.)

3-11-9. MS-39 Board

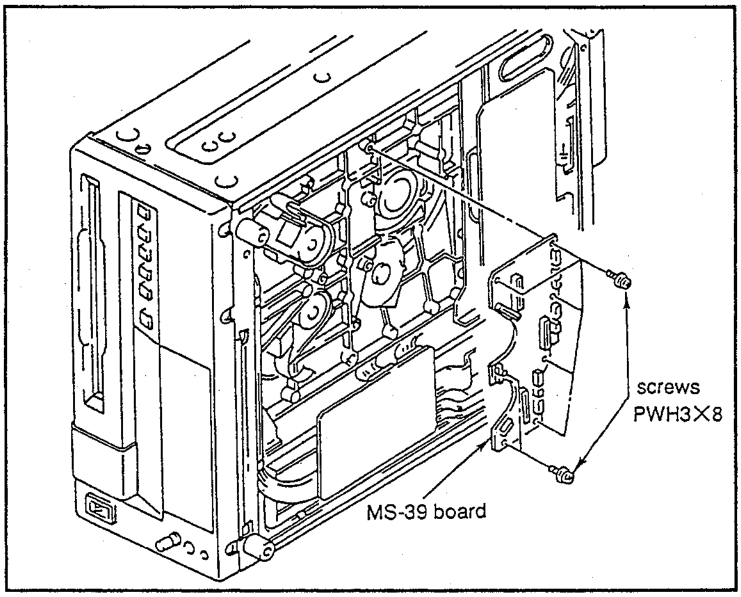
1. Remove the lower panel (Refer to Section 3-6.).
2. Remove the DR-214 board (Refer to Section 3-11-4.).
3. Remove the clamper, then pull out the flexible card wire.


MS-39 board
CN357
clamper
CN356

4. Disconnect the thirteen connectors (CN350, CN351, CN352, CN353, CN354, CN355, CN358, CN359, CN360, CN361, CN362, CN363, CN364) of the MS-39 board.

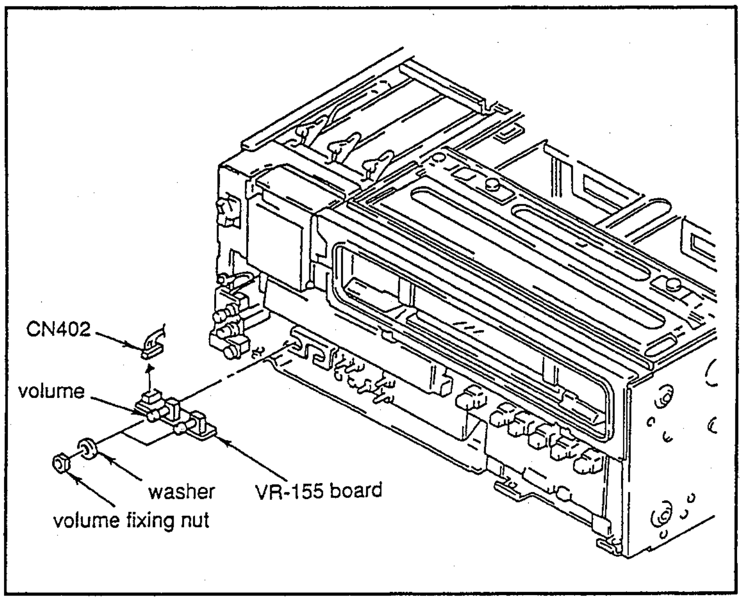

CN364
MS-39 board
CN350
CN357
CN359
CN353
CN363
CN361
CN360
CN352
CN355
CN358
CN351
CN354
CN362
CN356

5. Remove seven screws (PWH3×8), then remove the board.


screws
PWH3X8
MS-39 board

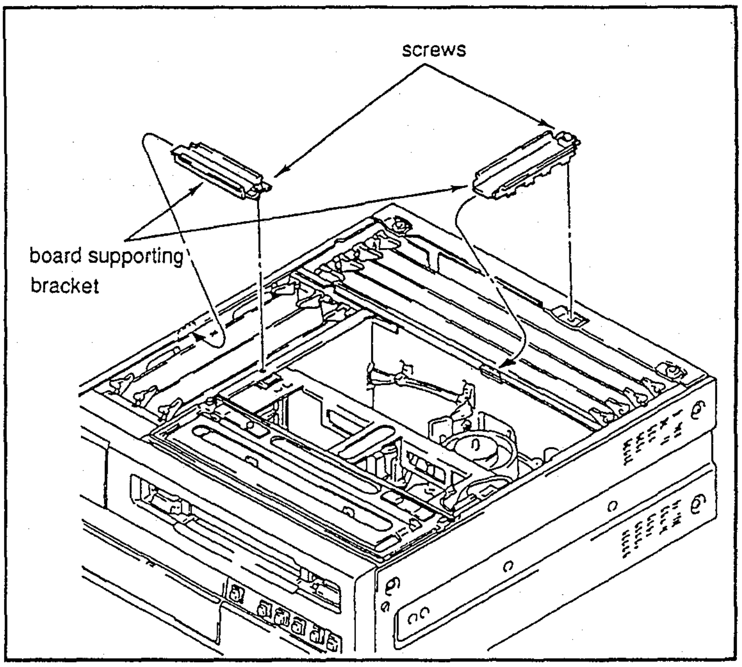
3-11-10. VR-155 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove two volume fixing nuts, then remove the board.
3. Disconnect the connector (CN402) of the VR-155 board.

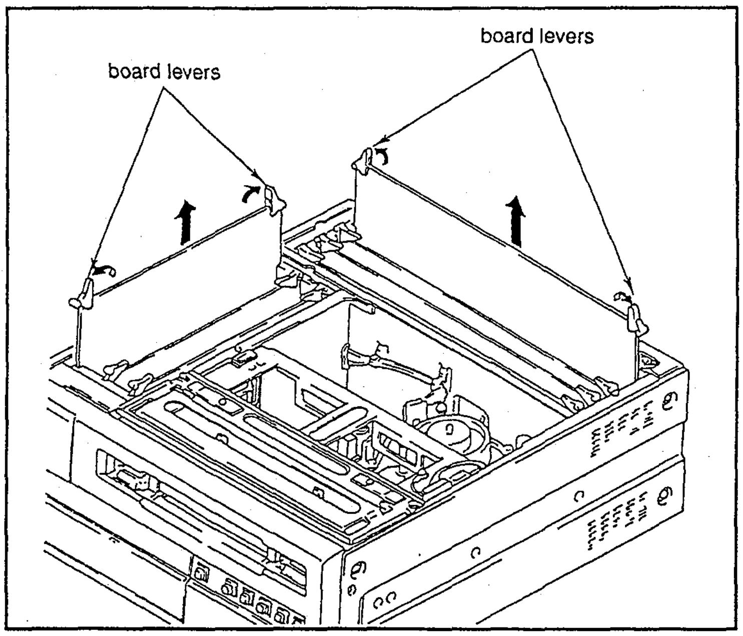

CN402
volume
washer
VR-155 board
volume fixing nut

3-11-11. Removal of the card board

1. Remove the upper panel (Refer to Section 3-6.).
2. Loosen the screws as shown in the figure, then remove the board supporting bracket.
   These screws are retained on the board supporting bracket, so they are not out of the stay.


screws
board supporting bracket

3. Pull up the board levers in the direction shown by the arrow, then lift up the board.

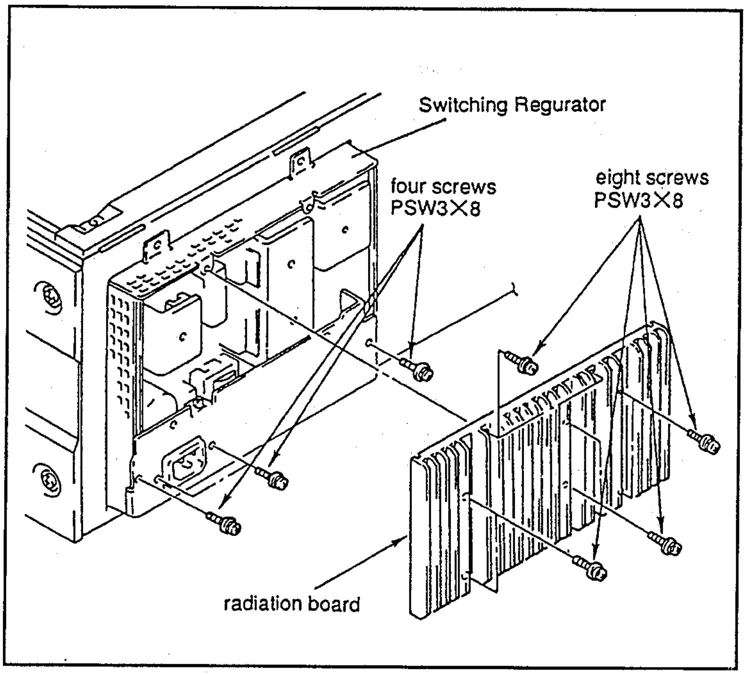

board levers
board levers

Note for installation

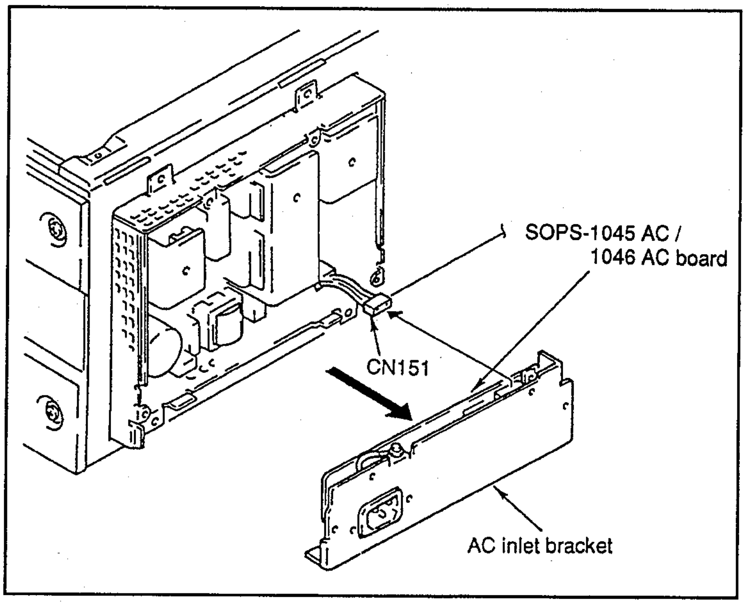
Insert the board along the board guide rails, then push it firmly until it engages with the connector on the mother board.

3-11-12. SOPS-1045 AC <for NTSC> / 1046 AC <for PAL> Board, SOPS-1045 M <for NTSC> / 1046 M <for PAL> Board (Inside the switching regulator)

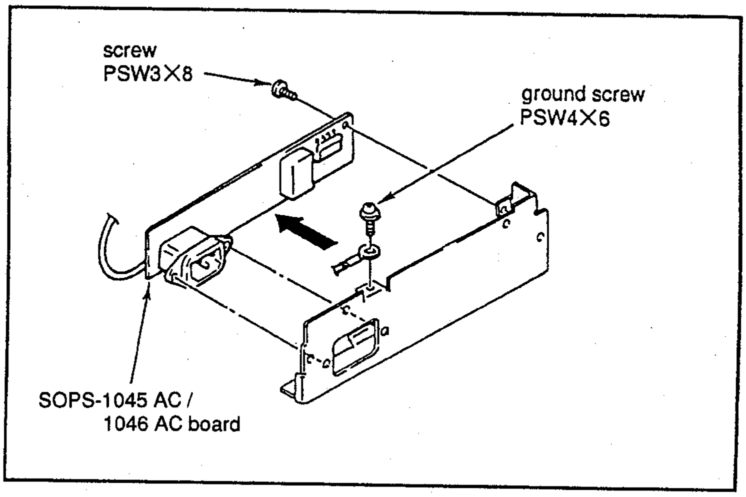
1. Remove eight screws (PSW3 × 8), then remove the radiation board.
2. Remove the four screws (PSW3 × 8) as shown in the figure.


Switching Regurator
four screws
PSW3X8
eight screws
PSW3X8
radiation board

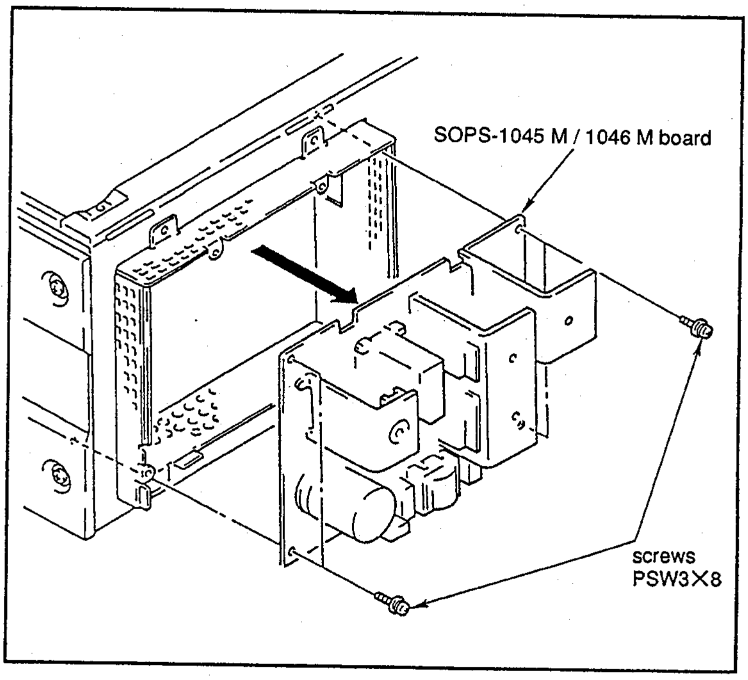
3. Pull out the AC inlet bracket and the SOPS-1045 AC /1046 AC board, then disconnect the connector (CN151).


SOPS-1045 AC /
1046 AC board
CN151
AC inlet bracket

4. Remove the screw (PSW3 × 8) tightened the board and the ground screw, then remove the SOPS-1046 AC board.


screw
PSW3X8
ground screw
PSW4X6
SOPS-1045 AC /
1046 AC board

5. Remove four screws, then remove the SOPS-1045 M / 1046 M board.


SOPS-1045 M / 1046 M board
screws
PSW3X8

3-12. TAKE OUT THE CASSETTE TAPE IN SLACKING (MANUAL MODE)

Be more careful not to damage the tape when taking out the cassette tape.

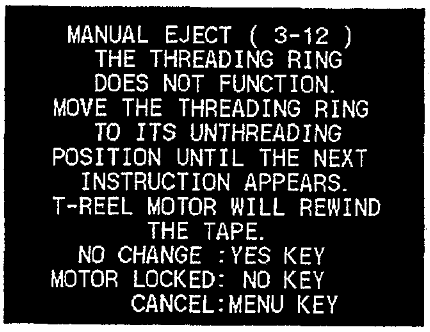
In case ERROR is detected

1. Press the EJECT KEY and put the unit into the EMERGENCY EJECT MODE (Refer to section 3-4-2.), then take out the cassette tape.

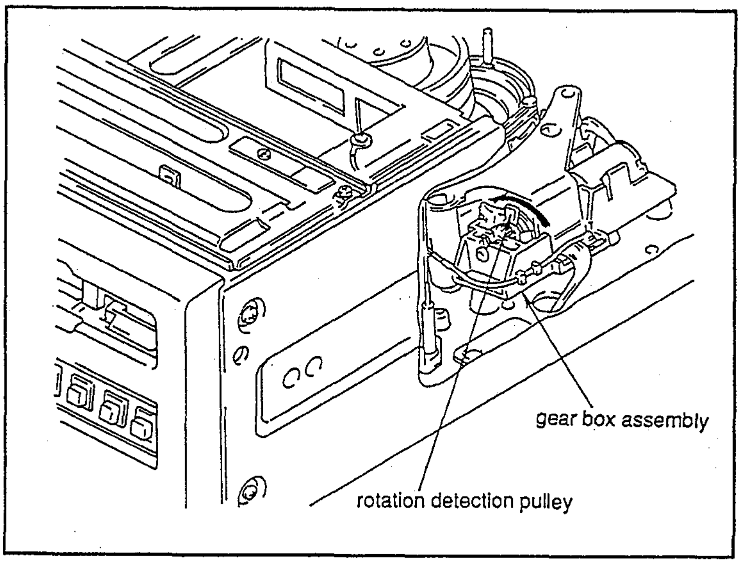
When the cassette tape cannot be taken out with the EMERGENCY EJECT MODE.

2. Referring to [Section 4 MAINTENANCE MENU], put the unit into the SERVICE SUPPORT MODE and select the MANUAL EJECT.
3. Take out the cassette tape by the display on the monitor picture.

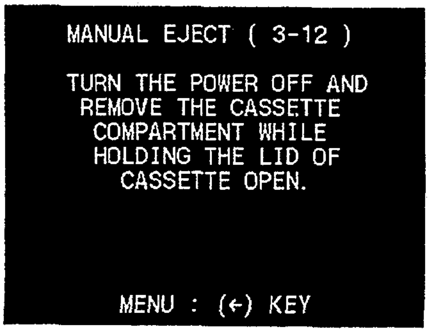
① In case the message below is displayed on the monitor picture, turn the rotation detection pulley of a gear box assembly in the direction shown by the arrow.



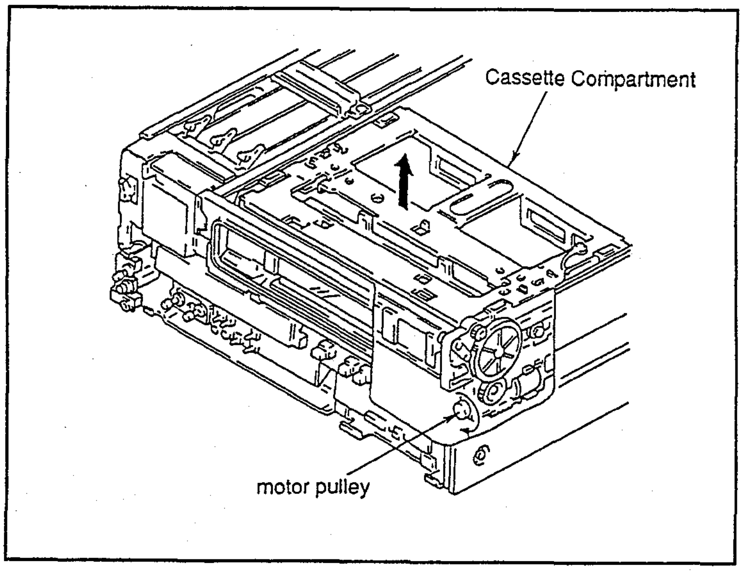
```
   MANUAL EJECT ( 3-12 )
     THE THREADING RING
     DOES NOT FUNCTION.
   MOVE THE THREADING RING
     TO ITS UNTHREADING
   POSITION UNTIL THE NEXT
    INSTRUCTION APPEARS.
   T-REEL MOTOR WILL REWIND
         THE TAPE.
    NO CHANGE :YES KEY
   MOTOR LOCKED: NO KEY
          CANCEL:MENU KEY
```



② In case the message below is displayed on the monitor picture, turn the motor pulley in the direction shown by the arrow, and the cassette compartment moves up, then take out the cassette tape.

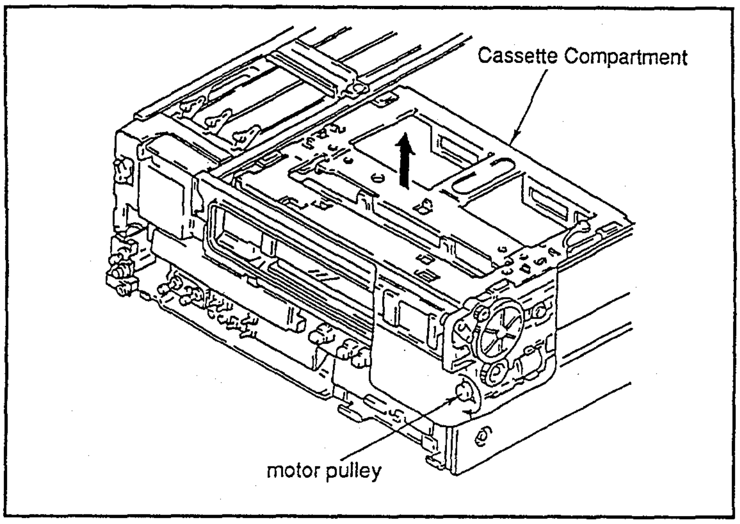


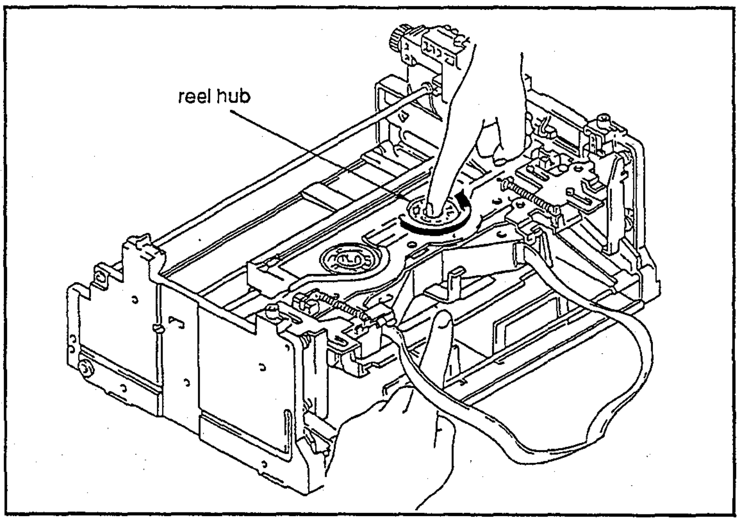
```
   MANUAL EJECT ( 3-12 )

   TURN THE POWER OFF AND
    REMOVE THE CASSETTE
     COMPARTMENT WHILE
     HOLDING THE LID OF
       CASSETTE OPEN.



       MENU : (←) KEY
```



③ In case of taking out the cassette tape by the removal of the cassette compartment stay.

1. Turn the power off.
2. Remove the upper panel (Refer to Section 3-6.).
3. Turn the rotation detection pulley in the direction shown by the arrow.
4. Remove the cassette compartment stay.
5. Disconnect the connector (CN930) on the CL-25 board of the cassette compartment.
6. Remove the front panel (Refer to Section 3-6.).
7. Turn the motor pulley as shown in the figure in the direction shown by the arrow.
8. While holding the cassette lid by hand to prevent it from closing so that the cassette compartment moves up (Stop rotating the pulley just before the cassette compartment begins to move to the surface.).
9. Take out the cassette compartment slowly from the unit while holding the cassette lid.
10. Wind the tape into the cassette by turning the reel hub with a finger and close the cassette lid.
11. Take out the cassette tape from the cassette compartment.
12. Turn the pulley as described in Step 7 so that the stage of the cassette compartment moves the cassette out position.
13. Install the cassette compartment to the unit.
14. Connect the connector (CN930), then install the cassette compartment stay.





3-13. CLEANING WHEN HEADS ARE CLOGGED

If the video head is clogged, clean the head as described in the following procedures.

- **Cleaning with the cleaning cassette**

1. Insert the cleaning cassette BCT-5CLN in the unit, and press the EJECT and PLAY buttons immediately (until one second).
   Check that the EJECT button blinks and the PLAY button lights on.
   Note : • Make sure to use the cleaning cassette BCT-5CLN. If the cleaning is performed by cleaning cassettes other than the BCT-5CLN, abnormal friction or damage of the video head may occur.
   • Press the EJECT and PLAY buttons immediately after inserting the cleaning cassette BCT-5CLN in the unit.

2. After the cleaning tape is in play mode for five seconds, the tape is ejected automatically.
   Note : Do not use the cleaning cassette with rewind.

3. Confirm that the head clog is clear.
   If the video head is clogged after Step 2, clean the video head as described in the following procedure.

- **Cleaning with the cleaning piece**

1. Hold the cleaning piece moistened with cleaning fluid against the heads gently.

2. Slowly rotate the upper drum in the direction of the head's rotation with hand and clean the video head.
   Note : • Do not move the cleaning piece in a vertical direction. This will damage the video head.
   • Be sure to turn the POWER OFF, when cleaning is performed.

3-14. HOW TO OPERATE THE UNIT WITHOUT CASSETTE TAPE

When some mechanical alignments are performed, the unit may be operated without inserting a cassette tape.

1. Remove a cassette compartment, or disconnect connector CN930 on the cassette compartment.
2. Set S201-1 and S201-4 switches on the SS-61 board (B-1) to on. Then, turn the power ON.
   Note : If the S201-4 switch on the SS-61 board (B-1) is not set to on, an error occurs.

The following procedures discribe the operation of the unit.

- Threading
  After the reel motor and upper drum are rotated, the threading ring begins to move, and the unit enters the threading mode.
  The tension arm and threading ring move to the regular positions, and threading is completed.
  This threading completed state is referred to as the STOP mode.

- PLAY
  Press the PLAY button.
  A pinch roller is pressed to the capstan shaft, and the unit enters the PLAY mode.
  If the PLAY button is pressed during the threading, the pinch roller is pressed to a capstan shaft after threading is completed, and the unit enters the PLAY mode.

- FF
  Press the F. FWD button.
  A pinch roller is pressed to a capstan shaft, and the unit enters the forward search mode. The tape speed is 5 times.

- REW
  Press the REW button.
  A pinch roller is pressed to a capstan shaft, and the unit enters the rewind search mode. The tape speed is 5 times.

- REC
  - A small cassette

    Press the PLAY and REC buttons while pressing the MISS-REC switch for small cassette on the left side of the supply reel table.

    A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

    When the MISS-REC switch is released, the unit is not in REC mode.
  - A large cassette

    Press the PLAY and REC buttons while pressing the MISS-REC switch for large cassette on the right side of the supply reel table.

    A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

    When the MISS-REC switch is released, the unit is not in REC mode.

- Unthreading

  Press the EJECT button.

  A threading ring begins to move, and the unit enters the unthreading mode.

  The threading ring moves to the regular positions, and unthreading is completed.

Note : After adjustment is completed, set the S201-1 and S201-4 switches on the SS-61 board (B-1) to off.

3-15. NOTE ON REPAIR PARTS

3-15-1. Notes on Repair Parts

(1) Safety Related Components Warning
Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors and Resistors
The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : µF
Resistors : Ω

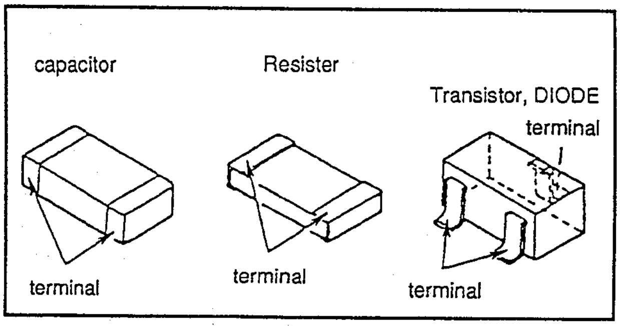
3-15-2. Replacement Procedure for Chip Parts

Required Tools

Soldering iron : 20 W If possible, use a soldering iron tip heat-controller at 270 ± 10 °C.
Braided wire : SOLDER TAUL or equivalent Sony part No. 7-641-300-81
Solder : 0.6 mm dia. is recommended.
Tweezers

Soldering Conditions

Soldering iron temperature : 270 ± 10 °C.
Soldering time : less than two seconds per a pin.



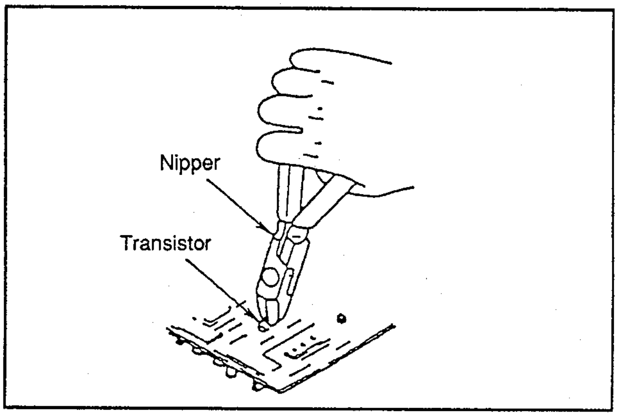
• Resistor and Capacitor Replacement

(1) Place the soldering iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
(2) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(3) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
(4) Place new chip part in the desired position and solder both ends.

Note : Once a chip part has been removed, never use it again.

• Transistor and Diode Replacement

(1) Cut the terminals of the chip part with a nipper.
(2) Remove the cut leads.
(3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
(5) Place new chip part in the desired position and solder the terminals.



• IC Replacement

(1) Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
(2) While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
(3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(4) After removing the chip part, presolder the area, in which the new chip part is to be place, with a thin layer of solder.
(5) Place new chip part in the desired position and solder the pins.

3-15-3. Replacement of Flexible Card Wires

The following flexible card wires are used on this unit. When handling a flexible card wire, be very careful not to bend it because this will remarkedly reduce its life.

Connection	Number of Pin	Number of Flexible Card Wire
DR-214 Board MS-39 Board	30P	3
KY-290 Board vacuum fluorescent tube display	20P	2
MS-39 Board RM-126 Board	13P	1
MS-39 Board RM-127 Board	13P	1
MB-604 Board MB-471 Board	34P	1
MB-604 Board CP-261 Board	17P	1

<ZIF Type>

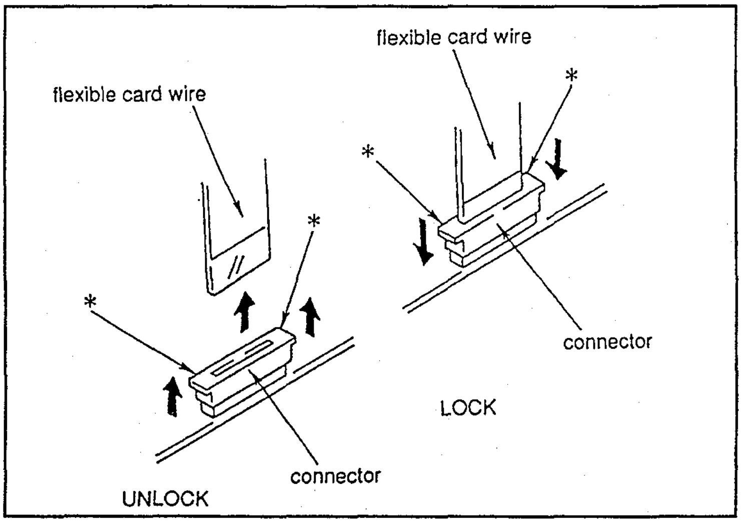
Disconnecting procedure

Pull up the ∗ marked points of connector, then pull out the flexible card wire from the connector.

Installing procedure

Install the flexible card wire as far as it will go (up to the line indicated on the flexible card wire), then push down the ∗ marked points of connector.

∗ In case the connector doesn't have the lock structure, install and disconnect the above procedures.

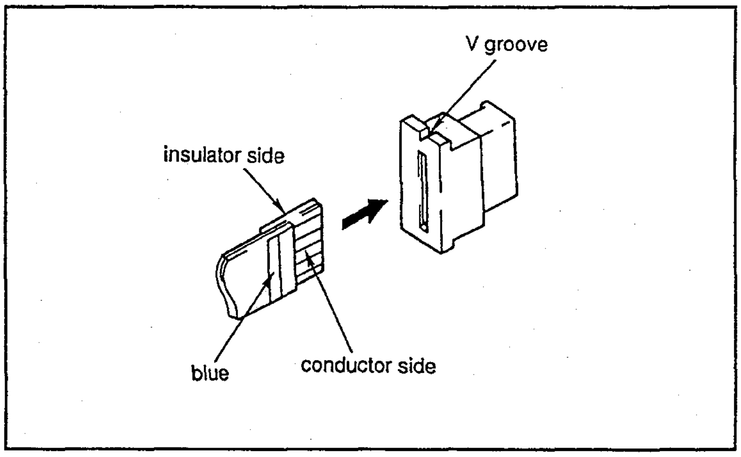


flexible card wire
flexible card wire
*
*
*
*
connector
LOCK
connector
UNLOCK

Note :

The flexible card wire consists of the conductor side and insulator side.

Connect the flexible card wire after checking the figure. If it is not properly connected, the circuit will not work.



V groove
insulator side
blue
conductor side

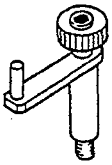
3-16. FIXTURES AND EQUIPMENTS

3-16-1. Fixtures

Fig. No	Part No.	Description	For use
1	J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
2	J-6001-830-A	Drum Eccentricity Gauge (2)	
3	J-6001-840-A or J-6325-530-A	Drum Eccentricity Gauge (1) or Drum Eccentricity Gauge (6)	
4	J-6031-820-A	Multi Connector Cable (DIBNC)	Video adjustment
5	J-6031-830-A	Multi Connector Cable (DOBNC)	
6	J-6080-029-A	Adjustment Mirror	Tape path adjustment
7	J-6087-000-A	Drum Eccentricity Gauge (5)	Upper drum eccentricity adjustment
8	J-6150-960-A	Reel Motor Shaft Slantness Check Fixture	Reel motor shaft slantness check and adjustment
9	J-6152-450-A	Wire Clearance Gauge	Clearance check
10	J-6320-680-A	Reel Table Height Gauge	Reel table height adjustment
11	J-6320-880-A	Cassette Base Plate (L)	Reel table height adjustment
12	J-6321-500-A	Tape Guide Adjustment Driver	Tape guide height adjustment
13	J-6332-780-A	Extension Board, EX-278	Extension board for SS, TBC, VP and VRA boards
14	J-6332-790-A	Extension Board, EX-279	Extension board for RP, AP and AR boards
15	J-6381-380-A	S Connector Cable, EW703	
16	2-034-697-00	Cleaning Piece	Cleaning
17	3-703-360-09	Parallel Pin (3×32)	Tension regulator magnet position adjustment
18	7-661-018-18	Oil	
19	7-662-010-04	Grease, SGL-505 (20 g)	
20	7-700-736-01	L-Shaped Hexagonal Wrench (d : 1.27 mm)	
21	7-700-736-05	L-Shaped Hexagonal Wrench (d : 1.5 mm)	
22	7-700-736-06	L-Shaped Hexagonal Wrench (d : 0.89 mm)	
23	8-960-096-51	Alignment Tape, CR2-1B PS	Servo and tracking alignments (metal particle tape)
24	8-960-096-91	Alignment Tape, CR5-1B PS	Video, audio and servo alignments (metal particle tape)
25	8-960-096-86	Alignment Tape, CR8-1B PS	Audio alignments (metal particle tape)
26	8-960-098-45	Alignment Tape, CR8-1A PS	Audio alignments (oxide tape)
27	9-911-053-00	Thickness Gauge	Clearance check
28	9-919-573-01	Cleaning Fluid	Cleaning
29	Standard	TENTEL METER (T2-H7-SLC)	Tension adjustment

Note : TENTEL and TENTELOMETER are registered trademark of TENTEL Corp.,
4475 Golden Foothill Pkwy El Dorado Hills, CA U.S.A.

①



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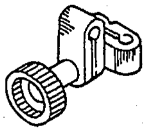

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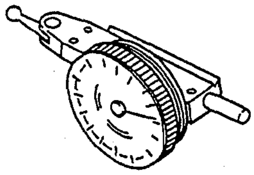

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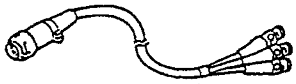

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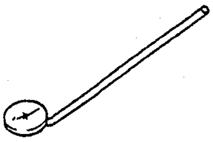

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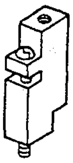

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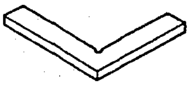

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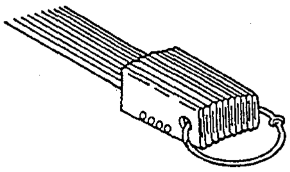

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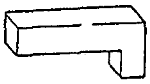

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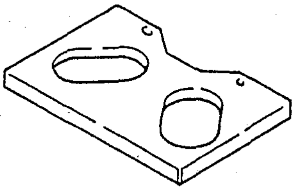

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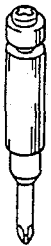
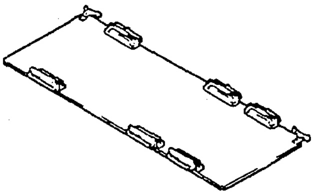
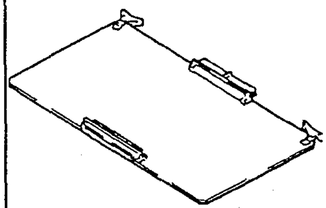


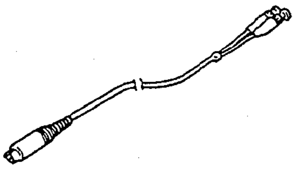
⑬



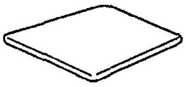
⑭



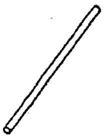
⑮



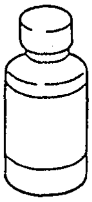
⑯



⑰

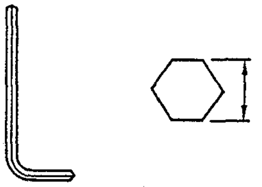


⑱

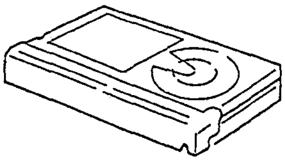


⑲

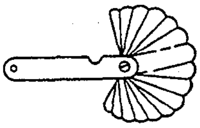
⑳, ㉑, ㉒



㉓, ㉔, ㉕, ㉖

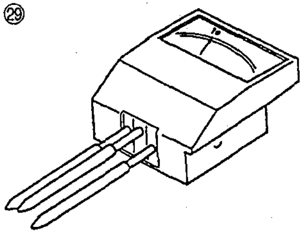


㉗



㉘

㉙



3-16-2. Required Equipment

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-131A (OP. 03)	
	Composite	TEKTRONIX TSG-131A (OP. 03)	
	Y/C	TEKTRONIX TSG-131A (OP. 03)	S-VIDEO SG
Waveform Monitor	Component	TEKTRONIX WFM300/300A/1781/1765 (OP. SC)	
	Composite	TEKTRONIX 1751/1781/1765 (OP. SC)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6845	

SECTION 4
MAINTENANCE MENU

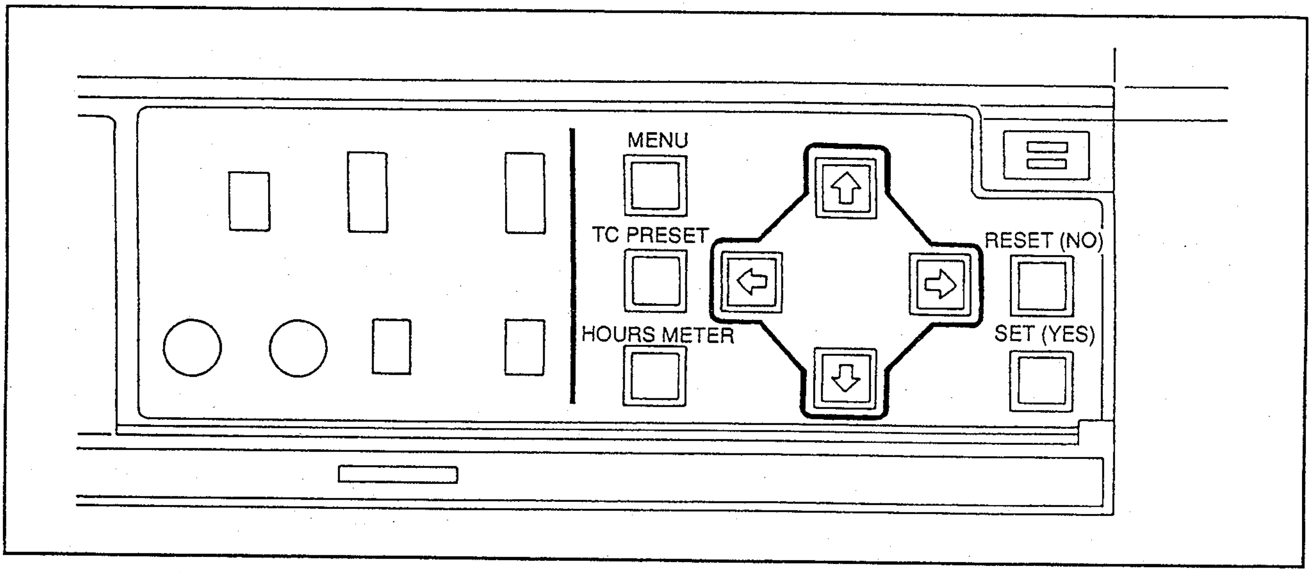
This equipment provides the maintenance menu which is necessary when performing maintenance.
The maintenance menu consists of some levels. Checks, settings and adjustments are performed by moving in these levels. Contents of the maintenance menu are displayed on the video monitor which is connected with VIDEO OUTPUT 2 connector and time counter.
( )...time counter display/ * ...UVW-1700G/1700GP only

	Menu Level 1	Menu Level 2	Menu Level 3
	MENU DATA CONTROL (MENU CNT)	MENU STATUS DISPLAY (>MENU STA) SAVE MENU DATA (>Save MENU) LOAD MENU DATA (>Load MENU)	—
*	EDIT CHECK (EDIT Check)	VIDEO INSERT (>VIDEO INS) ASSEMBLE (>ASSEMBLE)	—
	SERVO CHECK (SV Check)	SENSOR CHECK (>Sensor)	CASSETTE ID (>>Cass-ID) CASS-COMPARTMENT (>>Cass-COM) TAPE TOP / END (>>Top / End) HUMID [MOISTURE] (>>HUMID) REC INHIBIT (>>REC INHI.)
		MOTOR CHECK (>Motor)	S-REEL (>>S-Reel) T-REEL (>>T-Reel) THREADING (>>Threading) CASS-COMPARTMENT (>>Cass-COM) CAPSTAN (>>Capstan) DRUM (>>Drum) REEL POSITION (>>Reel POS.)
		PLUNGER CHECK (>Plunger)	PINCH (>>Pinch) S-REEL BRAKE (>>S-Brake) T-REEL BRAKE (>>T-Brake)
		AUTO CHECK (>Auto)	WITHOUT A TAPE (>>No tape) WITH A TAPE (>>Tape) WITH ALIGNMENT TAPE (>>Alignment) WITH A NEW TAPE (>>New tape)
	SERVO ADJUST (SV Adjust)	S / T REEL & CAPSTAN (>Reel&Cap) S-REEL ONLY (>S-Reel) T-REEL ONLY (>T-Reel) CAPSTAN ONLY (>Capstan)	—
		TENSION (>Tension)	MAGNET & HOOK POS. (>>Magnet) HOOK POS. (>>HOOK) TENSION (>>Tension)
		RF SWITCHING POSITION (>Switching)	AUTO (>>Auto) MANUAL (>>Manual)

	Menu Level 1		Menu Level 2		Menu Level 3
	SERVO ADJUST (SV Adjust)		PICTURE SPLITTING (>Splitting)		—
			SAVE/LOAD CONTROL (>Save/Load)		SAVE ADJUSTING DATA (>>Save) LOAD ADJUSTING DATA (>>Load) INITIALIZE (>>Initial)
	SERVICE SUPPORT (Support)		ERROR LOG (>Error LOG) ERROR DIAGNOSTICS (>Erro DIAG) DEVICE DIAGNOSTICS (>Dew. DIAG) MANUAL EJECT (>Manu. Eject) DIAGNOSTICS CONTROL (>Diag. Cont)		—
	OTHERS (Others)		SOFTWARE VERSION (>Version) KEYBOARD CHECK (>KY check) CF DATA CHECK (>CF check)		—
			MEMORY DISPLAY (>MEM Check)		SY MEMORY DISPLAY (>>SY MEM.) SV MEMORY DISPLAY (>>SV MEM.)

4-1. OPERATION

Following switches are used so as to execute the maintenance menu.



The MENU/ ↑ / ↓ /←/→/SET (YES) /RESET (NO) switches on the sub control panel are used.
The maintenance menu consists of some levels. Select an item by moving in these levels.

↑ / ↓ key ....Moving in the same level.
←/→ key ....Moving to the upper or lower level. (Ignored if a lower level does not exit.)
* Display ......Monitor : Displayed item is shifted down one column.
Time counter : ">" is displayed on top.
} Indicates the level of the menu.

[How to enter the maintenance menu]

1. While pressing the (←) key, press the MENU key.
   Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the (↑), (↓) keys to select the item to change.
   Move the high lighted item to select the item on a monitor display.
3. Press the (→) key at the item to select.
   This selects the high lighted item.

[How to close the maintenance menu]

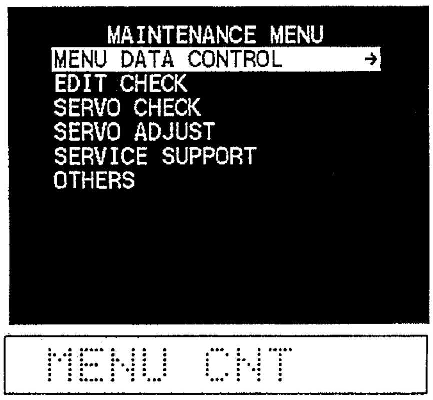
Press the MENU key.

4-2. MENU DATA CONTROL

This item allows SETUP MENU data display and SETUP MENU data save/load.
This allows restoring the original setup after maintenance is complete or after ROM version is updated.

[Procedure]

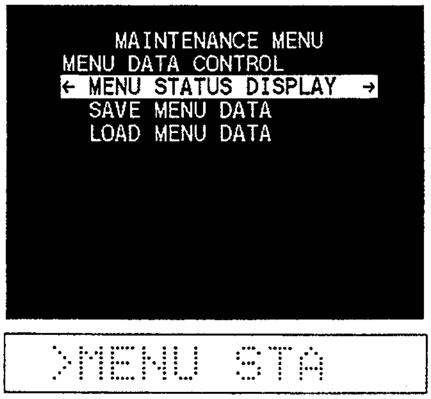
1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "MENU DATA CONTROL" on the monitor display using the (↑), (↓) keys.



MAINTENANCE MENU
MENU DATA CONTROL →
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS

MENU CNT

3. Press the (→) key.
Then "MENU DATA CONTROL" is selected, and the menu of the lower level is displayed.



MAINTENANCE MENU
MENU DATA CONTROL
← MENU STATUS DISPLAY →
SAVE MENU DATA
LOAD MENU DATA

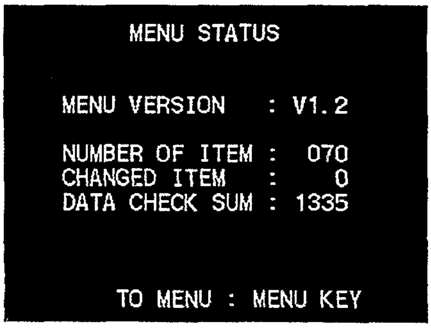
>MENU STA

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

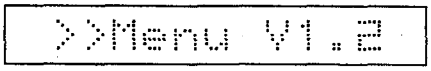
MENU STATUS DISPLAY

The contents of the current SETUP MENU data are displayed.

MENU VERSION	: Setup menu version of this unit.
NUMBER OF ITEM	: Number of setup menu item.
CHANGED ITEM	: The number of items which are changed from the factory default settings.
DATA CHECK SUM	: Data check sum.



```
MENU STATUS

MENU VERSION    : V1.2

NUMBER OF ITEM :  070
CHANGED ITEM   :    0
DATA CHECK SUM : 1335

TO MENU : MENU KEY
```

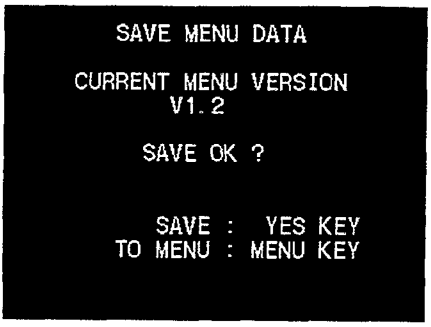


```
>>Menu V1.2
```

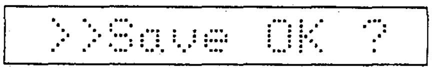
SAVE MENU DATA

The user-set setup menu data can be temporarily saved to be used for re-setup at a latter time.

1. The current setup menu version is displayed, waiting for the SET (YES) key input.
   * Press the RESET or LEFT keys to return to the menu picture.
   Press the MENU key to exit the maintenance menu.

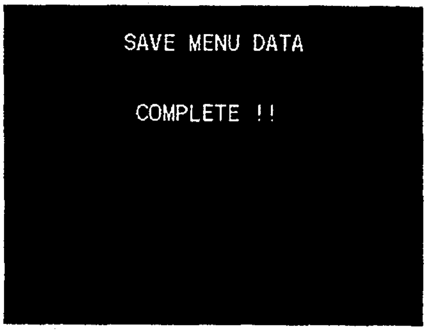


```
SAVE MENU DATA

CURRENT MENU VERSION
V1.2

SAVE OK ?

SAVE :  YES KEY
TO MENU : MENU KEY
```

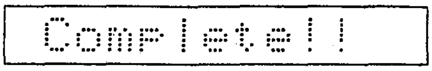


```
>>Save OK ?
```

2. Press the SET (YES) key.
   Memorize the setup menu data to EEPROM.
   Confirm that save is performed, and "Complete !!" is displayed.



```
SAVE MENU DATA

COMPLETE !!
```



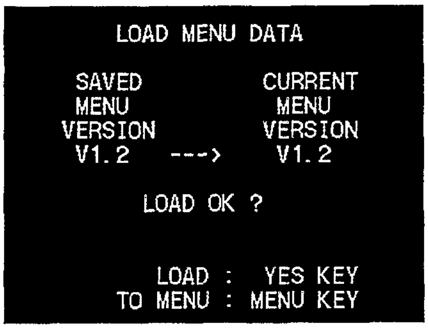
```
Complete!!
```

Note :
- The saved setup menu data will not be lost by turning ON/OFF the power, replacing boards or updating the ROM version. But because the saved data is stored in the MS microprocessor, the saved data will be lost when the MS board or the MS microprocessor is replaced.
- When the setup menu version is revised by updating the ROM version, the following alarm message is displayed. In that case, initialize the SETUP MENU or execute the "LOAD MENU DATA".

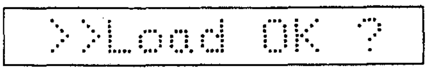
LOAD MENU DATA

When loading is executed, the saved data is saved as an ordinary setup menu data.

1. The current setup menu and the setup menu version to load are displayed, waiting for the SET (YES) key input.
   * Press the RESET or LEFT keys to return to the menu picture. Press the MENU key to exit the maintenance menu.

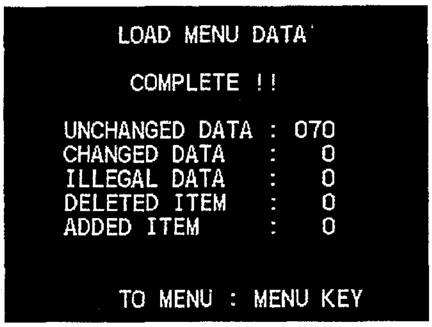


```
        LOAD MENU DATA

  SAVED            CURRENT
  MENU              MENU
 VERSION           VERSION
  V1.2    --->      V1.2

         LOAD OK ?

           LOAD :  YES KEY
        TO MENU : MENU KEY
```

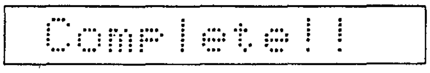


```
>>Load  OK  ?
```

2. Press the SET (YES) key.
   Memorize the setup menu data to EEPROM.
   Confirm that load is performed, and "Complete !!" is displayed.



```
        LOAD MENU DATA

        COMPLETE !!

 UNCHANGED DATA : 070
 CHANGED DATA   :   0
 ILLEGAL DATA   :   0
 DELETED ITEM   :   0
 ADDED ITEM     :   0

        TO MENU : MENU KEY
```



```
Complete!!
```

In case of NG

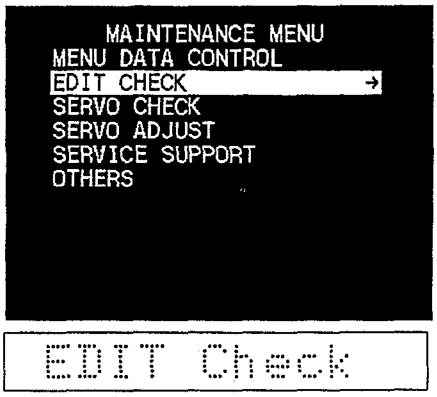
If the setup menu data has not been saved yet, or the saved menu has trouble, the load operation will not start.

4-3. EDIT CHECK

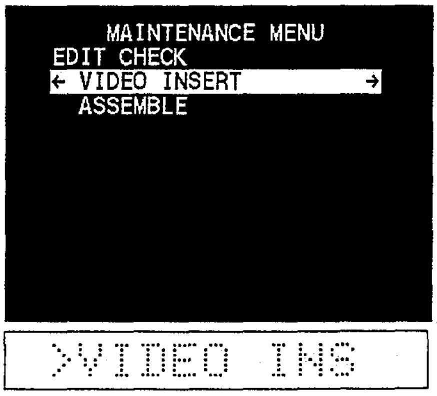
This item allows check of edit function without using a remote controller, and so on.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "EDIT CHECK" on the monitor display using the (↑), (↓) keys.


MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK →
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
EDIT Check

3. Press the (→) key. Then "EDIT CHECK" is selected, and the menu of the lower level is displayed.


MAINTENANCE MENU
EDIT CHECK
← VIDEO INSERT →
ASSEMBLE
>VIDEO INS

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

VIDEO INSERT

When the REC and PLAY keys are pressed at the same time, the VIDEO INSERT mode is entered.

ASSEMBLE

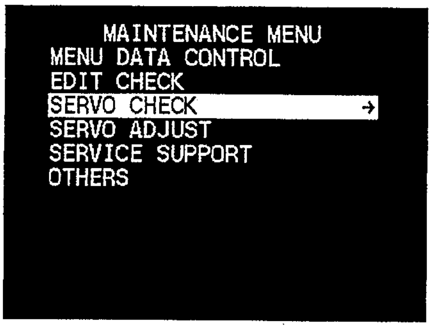
When the REC and PLAY keys are pressed at the same time, the ASSEMBLE mode is entered.

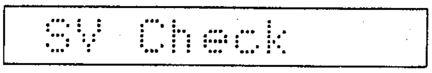
4-4. SERVO CHECK

Servo system is checked automatically or semiautomatically in this item.

[Procedure]

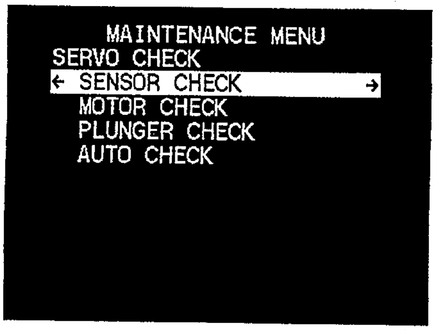
1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO CHECK" on the monitor display using the (↑), (↓) keys.

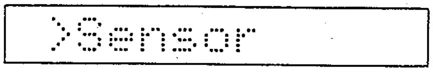

MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK →
SERVO ADJUST
SERVICE SUPPORT
OTHERS



3. Press the (→) key. Then "SERVO CHECK" is selected, and the menu of the lower level is displayed.

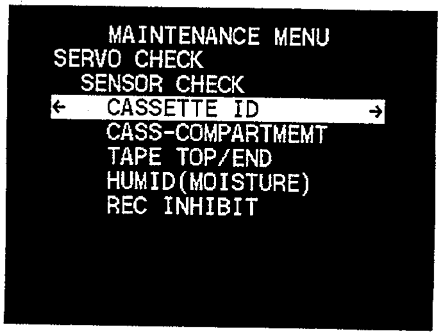
4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.
   Then the menus of the lower level are displayed.

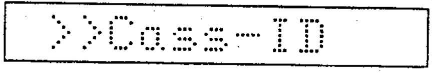

MAINTENANCE MENU
SERVO CHECK
← SENSOR CHECK →
MOTOR CHECK
PLUNGER CHECK
AUTO CHECK



6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.
   (Refer to each page of menu item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
   Or, press the (←) key to return to the MENU key.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

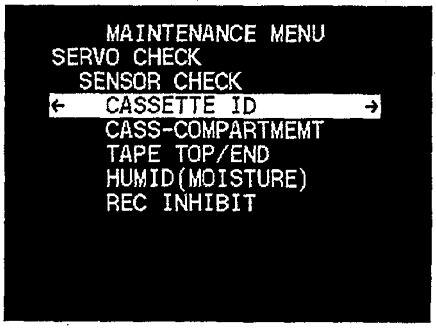
Note : When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.


MAINTENANCE MENU
SERVO CHECK
SENSOR CHECK
← CASSETTE ID →
CASS-COMPARTMEMT
TAPE TOP/END
HUMID(MOISTURE)
REC INHIBIT

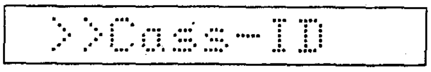


SENSOR CHECK

The items of the "SENSOR CHECK" are explained here.



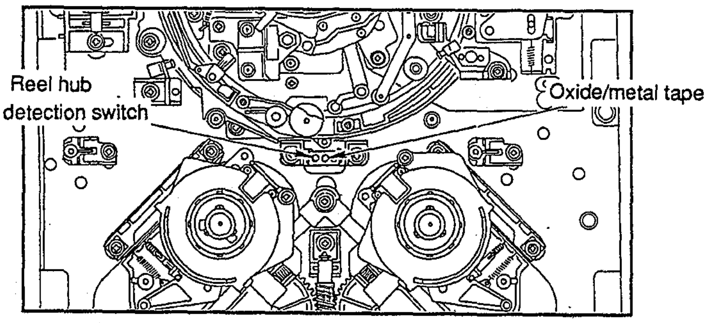
```
      MAINTENANCE MENU
  SERVO CHECK
    SENSOR CHECK
←     CASSETTE ID              →
      CASS-COMPARTMEMT
      TAPE TOP/END
      HUMID(MOISTURE)
      REC INHIBIT
```

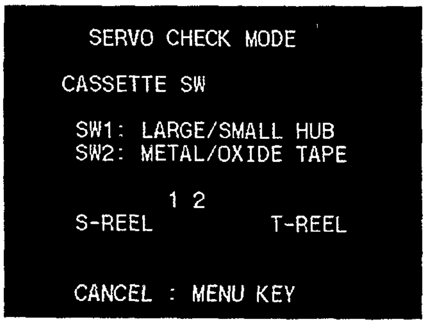


```
>>Cass-ID
```

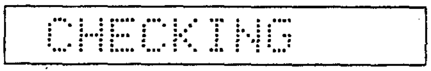
(1) CASSETTE ID

This mode checks the cassette detection switch.



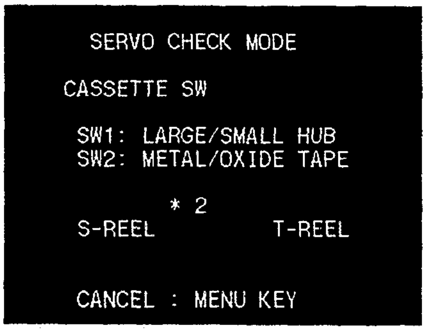


```
   SERVO CHECK MODE

 CASSETTE SW

  SW1: LARGE/SMALL HUB
  SW2: METAL/OXIDE TAPE

         1 2
  S-REEL          T-REEL


  CANCEL : MENU KEY
```



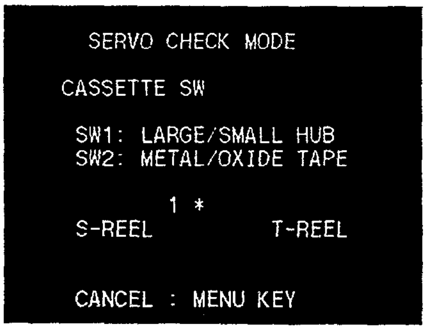
```
CHECKING
```

1. Press the reel hub detection switch with finger and so forth.
   Confirm that ∗ is displayed on the "1" which is in the monitor.



```
   SERVO CHECK MODE

 CASSETTE SW

  SW1: LARGE/SMALL HUB
  SW2: METAL/OXIDE TAPE

         * 2
  S-REEL          T-REEL


  CANCEL : MENU KEY
```

2. Press the oxide/metal tape detection switch with finger and so forth.
   Confirm that ∗ is displayed on the "2" which is in the monitor.



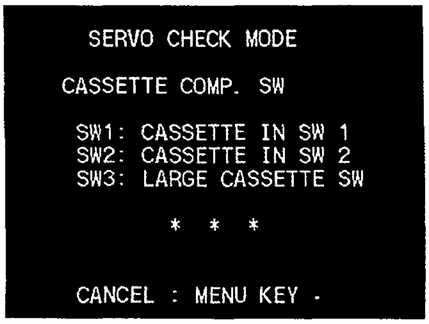
```
   SERVO CHECK MODE

 CASSETTE SW

  SW1: LARGE/SMALL HUB
  SW2: METAL/OXIDE TAPE

         1 *
  S-REEL          T-REEL


  CANCEL : MENU KEY
```

In case of NG

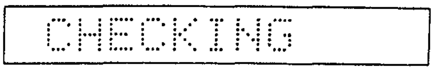
If ∗ isn't display on the appointed number, check the sensor on the MS-39 board.

(2) CASS-COMPARTMENT

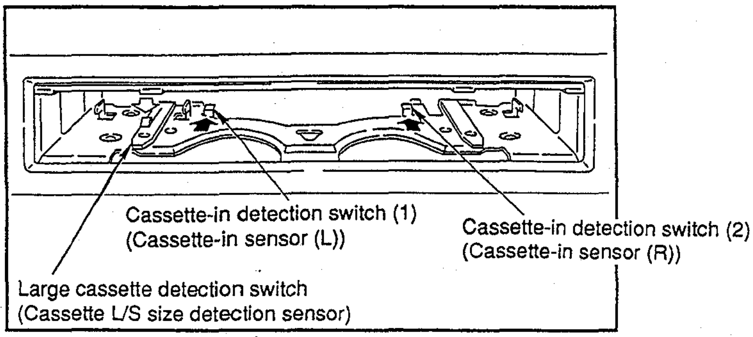
This item checks the Cassette Compartment switch.



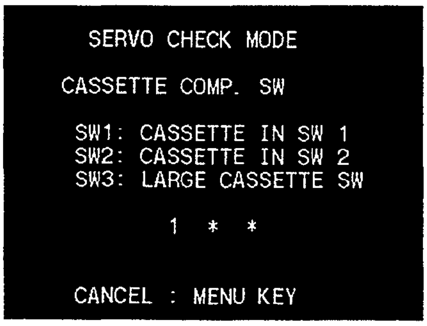
```
SERVO CHECK MODE

CASSETTE COMP. SW

SW1: CASSETTE IN SW 1
SW2: CASSETTE IN SW 2
SW3: LARGE CASSETTE SW

* * *


CANCEL : MENU KEY
```



CHECKING

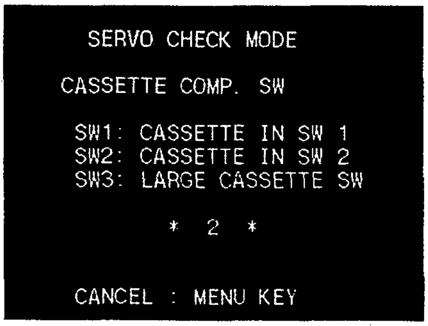

Cassette-in detection switch (1)
(Cassette-in sensor (L))
Cassette-in detection switch (2)
(Cassette-in sensor (R))
Large cassette detection switch
(Cassette L/S size detection sensor)

1. Press the cassette-in detection switch (1) (cassette-in sensor (L)) by hand and so on.
   Confirm that ∗ is displayed on the “1” which is in the monitor.



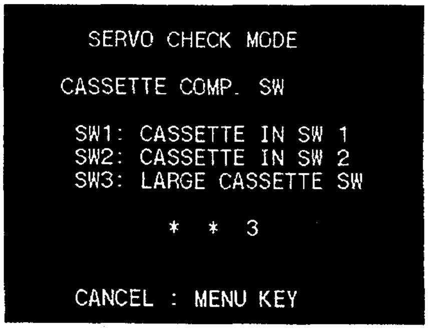
```
SERVO CHECK MODE

CASSETTE COMP. SW

SW1: CASSETTE IN SW 1
SW2: CASSETTE IN SW 2
SW3: LARGE CASSETTE SW

1 * *


CANCEL : MENU KEY
```

2. Press the cassette-in detection switch (2) (cassette-in sensor (R)) by hand and so on.
   Confirm that ∗ is displayed on the “2” which is in the monitor.



```
SERVO CHECK MODE

CASSETTE COMP. SW

SW1: CASSETTE IN SW 1
SW2: CASSETTE IN SW 2
SW3: LARGE CASSETTE SW

* 2 *


CANCEL : MENU KEY
```

3. Press the cassette-in detection switch (3) (cassette L/S size detection sensor) by hand and so on.
   Confirm that ∗ is displayed on the “3” which is in the monitor.



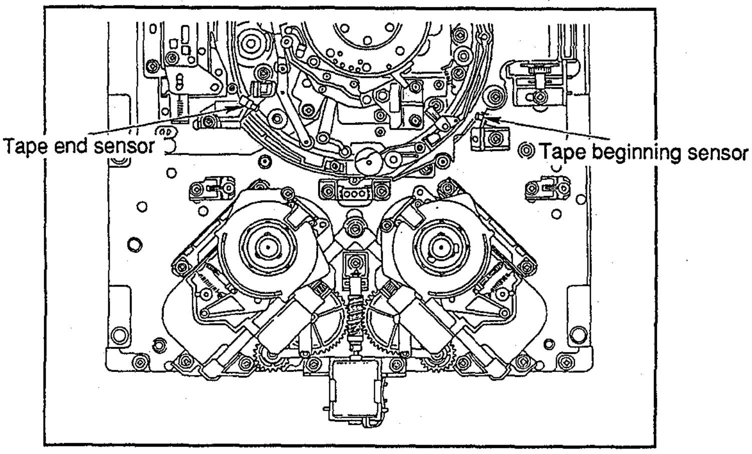
```
SERVO CHECK MODE

CASSETTE COMP. SW

SW1: CASSETTE IN SW 1
SW2: CASSETTE IN SW 2
SW3: LARGE CASSETTE SW

* * 3


CANCEL : MENU KEY
```

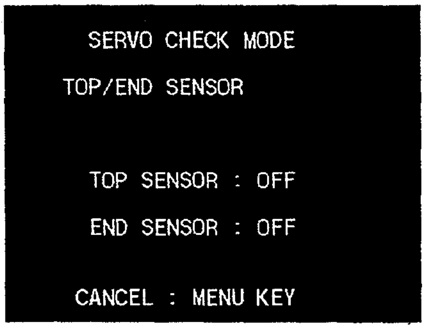
In case of NG

If ∗ isn't displayed on the appointed number, check the sensor on the PTC-62 board and the sensor input circuit (MS-39 board).

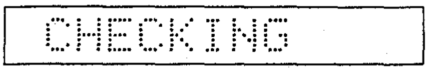
(3) TAPE TOP/END

This item checks the tape beginning/end sensor.



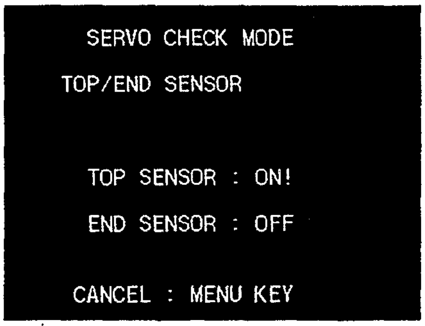


```
SERVO CHECK MODE
TOP/END SENSOR

TOP SENSOR : OFF
END SENSOR : OFF

CANCEL : MENU KEY
```



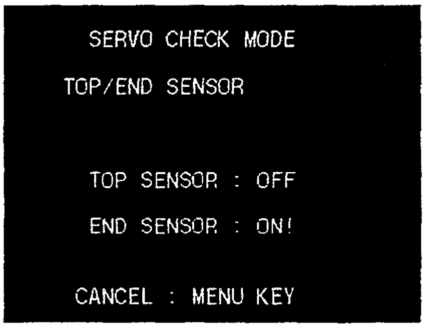
```
CHECKING
```

1. Draw a screwdriver up to the tape beginning sensor. Confirm that "TOP SENSOR: OFF" which is in the monitor changes into "TOP SENSOR: ON!"



```
SERVO CHECK MODE
TOP/END SENSOR

TOP SENSOR : ON!
END SENSOR : OFF

CANCEL : MENU KEY
```

2. Draw a screwdriver up to the tape end sensor. Confirm that "END SENSOR: OFF" which is in the monitor changes into "END SENSOR: ON!"



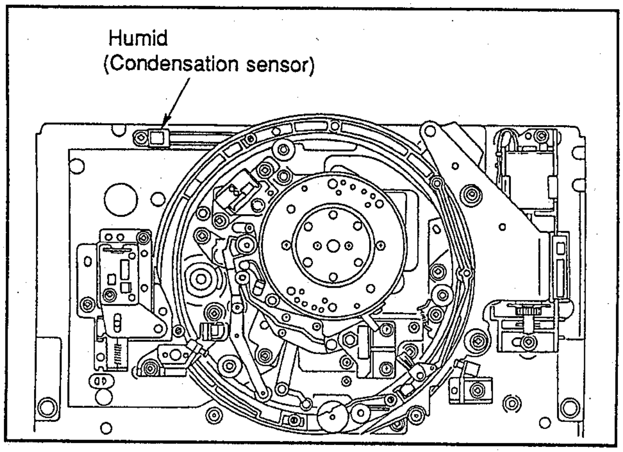
```
SERVO CHECK MODE
TOP/END SENSOR

TOP SENSOR : OFF
END SENSOR : ON!

CANCEL : MENU KEY
```

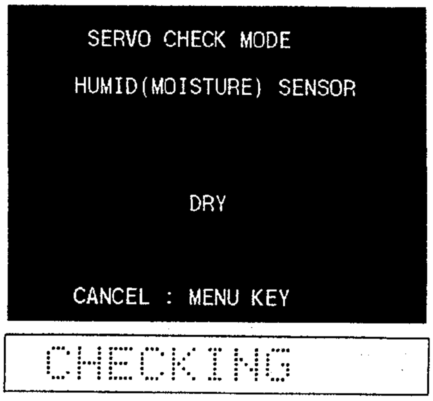
In case of NG

If "OFF" does not change into "ON!", check that the tape beginning/end sensor is normal or not, individually. And check the tape beginning/end sensor circuit (DR-214 board).

(4) HUMID (MOISTURE)

This item checks the humid (condensation) sensor.



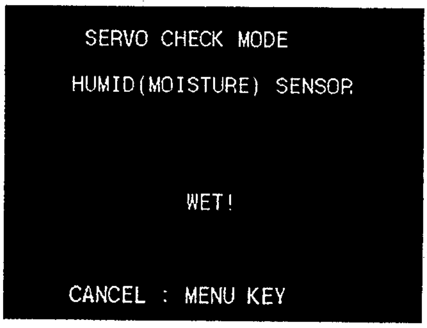

SERVO CHECK MODE
HUMID(MOISTURE) SENSOR

DRY

CANCEL : MENU KEY

CHECKING

1. Touch the humid (moisture) sensor softly with a wet applicator.
   Confirm that "DRY" which is in the monitor picture changes into "WET!"


SERVO CHECK MODE
HUMID(MOISTURE) SENSOR

WET!

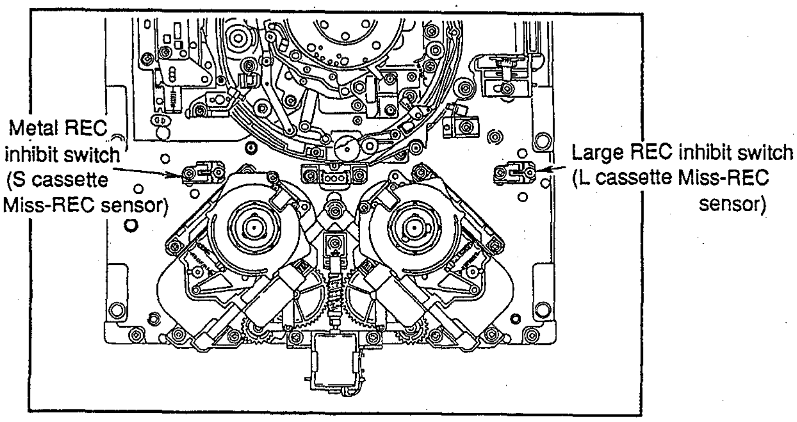
CANCEL : MENU KEY

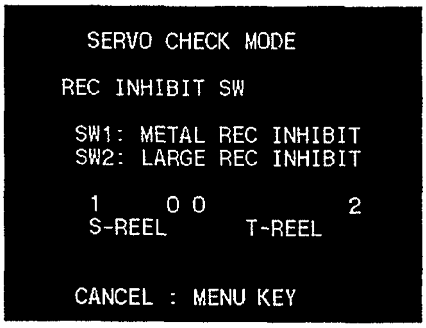
2. Mop the moisture of the humid (moisture) sensor with a dry applicator, or blow the sensor with a blower to evaporate.
   Confirm that "WET!" which is in the monitor picture changes into "DRY!"

In case of NG
If "DRY" does not change to "WET!" when the humid sensor is damped, check that condensation sensor is normal or not, individually. And check the humid sensor amplifier (SS-53 board).

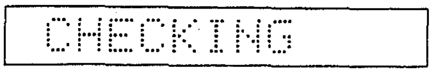
(5) REC INHIBIT

This item checks the REC inhibit switch.


Metal REC inhibit switch (S cassette Miss-REC sensor)
Large REC inhibit switch (L cassette Miss-REC sensor)

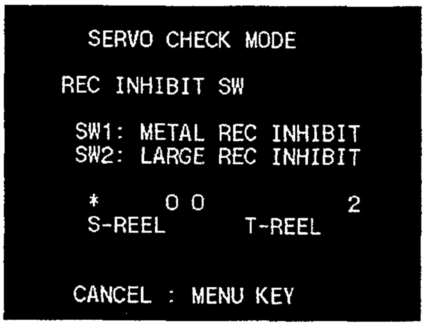


```
SERVO CHECK MODE
REC INHIBIT SW
SW1: METAL REC INHIBIT
SW2: LARGE REC INHIBIT
1     0 0          2
S-REEL       T-REEL

CANCEL : MENU KEY
```



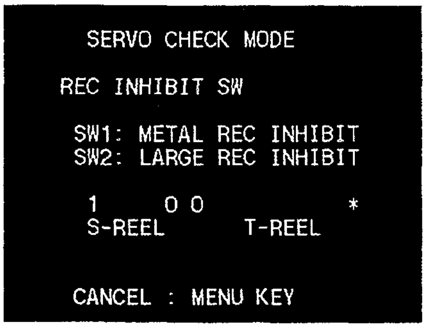
```
CHECKING
```

1. Press the metal REC inhibit switch (S cassette MISS-REC sensor).
   Confirm that * is displayed on the "1" which is in the monitor.



```
SERVO CHECK MODE
REC INHIBIT SW
SW1: METAL REC INHIBIT
SW2: LARGE REC INHIBIT
*     0 0          2
S-REEL       T-REEL

CANCEL : MENU KEY
```

2. Press the large REC inhibit switch (L cassette MISS-REC sensor).
   Confirm that * is displayed on the "2" which is in the monitor.



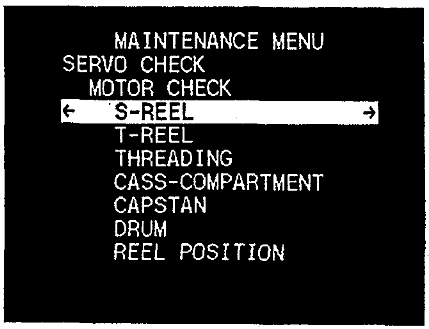
```
SERVO CHECK MODE
REC INHIBIT SW
SW1: METAL REC INHIBIT
SW2: LARGE REC INHIBIT
1     0 0          *
S-REEL       T-REEL

CANCEL : MENU KEY
```

In case of NG

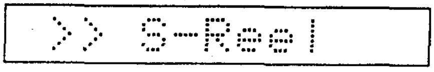
If * is not displayed on the appointed number, check the sensor on the MS-39 board.

MOTOR CHECK

The items of the "Motor check" are explained here.



```
        MAINTENANCE MENU
    SERVO CHECK
      MOTOR CHECK
←       S-REEL                →
        T-REEL
        THREADING
        CASS-COMPARTMENT
        CAPSTAN
        DRUM
        REEL POSITION
```

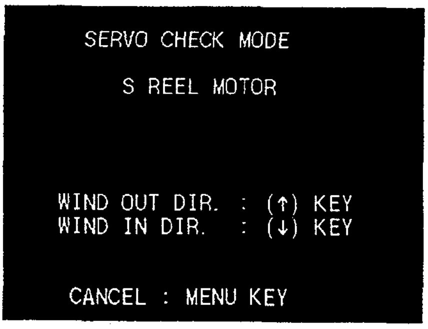


```
>> S-Reel
```

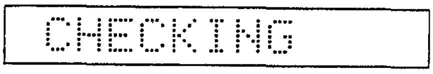
(1) S-REEL

This mode checks the S-reel motor.

After selecting the SET (YES) key, press the (↑), (↓) keys. (note: Keep pressing for 1 to 2 seconds.) This rotates the motor in FWD or REV direction. Check that the brake solenoid is activated to release the reel brake. The S-reel motor rotates in the specified direction as long as the (↑), (↓) key is pressed.



```
      SERVO CHECK MODE

        S REEL MOTOR


  WIND OUT DIR.  :  (↑) KEY
  WIND IN DIR.   :  (↓) KEY


   CANCEL  :  MENU KEY
```



```
CHECKING
```

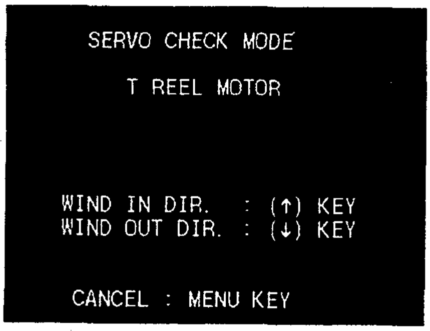
In case of NG

If the brake solenoid does not make the actuating sound, and the S-reel motor does not rotate in the selected direction, check the S-reel motor and the reel motor driver circuit (DR-214 board and SS-61 board).

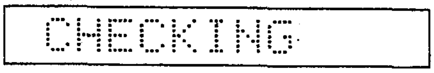
(2) T-REEL

This mode checks the T-reel motor.

After selecting the SET (YES) key, press the (↑), (↓) keys. (note: Keep pressing for 1 to 2 seconds.) This rotates the motor in FWD or REV direction. Check that the brake solenoid is activated to release the reel brake. The T-reel motor rotates in the specified direction as long as the (↑), (↓) key is pressed.



```
      SERVO CHECK MODE

        T REEL MOTOR


  WIND IN DIR.   :  (↑) KEY
  WIND OUT DIR.  :  (↓) KEY


   CANCEL  :  MENU KEY
```



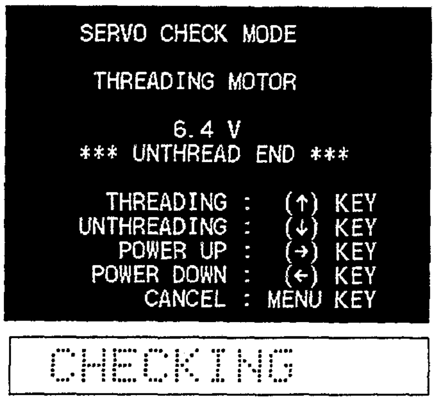
```
CHECKING
```

In case of NG

If the brake solenoid does not make the actuating sound, and the T-reel motor does not rotate in the selected direction, check the T-reel motor and the reel motor driver circuit (DR-214 board and SS-61 board).

(3) THREADING

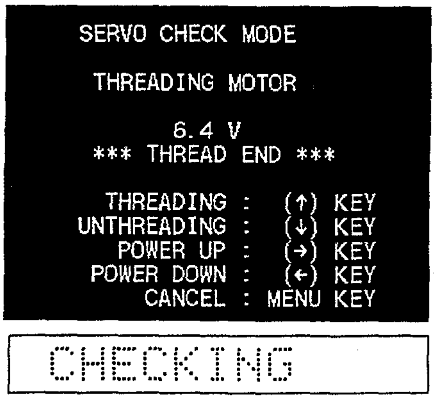
This item checks the threading motor and threading-end/unthreading sensor.



```
SERVO CHECK MODE

 THREADING MOTOR

      6.4 V
*** UNTHREAD END ***

  THREADING :  (↑) KEY
UNTHREADING :  (↓) KEY
   POWER UP :  (→) KEY
 POWER DOWN :  (←) KEY
     CANCEL : MENU KEY
```

```
CHECKING
```

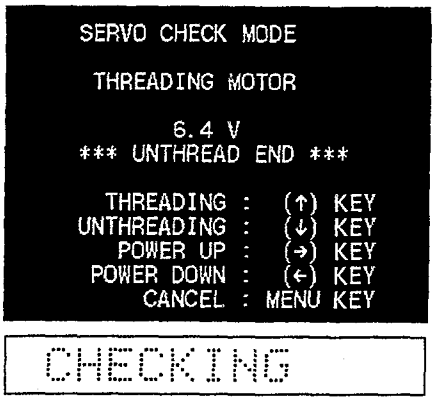
1. After selecting the SET (YES) key, keep pressing the (↑) key to rotate the motor in the FWD direction. Confirm that threading takes place and "THREAD END" is displayed on monitor.



```
SERVO CHECK MODE

 THREADING MOTOR

      6.4 V
 *** THREAD END ***

  THREADING :  (↑) KEY
UNTHREADING :  (↓) KEY
   POWER UP :  (→) KEY
 POWER DOWN :  (←) KEY
     CANCEL : MENU KEY
```

```
CHECKING
```

2. Keep pressing the (↓) key to rotate the motor in REV direction. Confirm that the threading ring is unthreaded and "UNTHREAD END" is displayed.

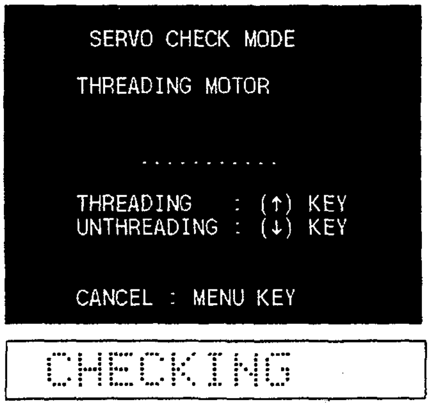


```
SERVO CHECK MODE

 THREADING MOTOR

      6.4 V
*** UNTHREAD END ***

  THREADING :  (↑) KEY
UNTHREADING :  (↓) KEY
   POWER UP :  (→) KEY
 POWER DOWN :  (←) KEY
     CANCEL : MENU KEY
```

```
CHECKING
```

In case of NG

If the threading motor does not rotate, "......" is displayed on the monitor after finishing threading, or "UNTHREAD END" is not displayed on the monitor after finishing unthreading, confirm that whether the threading motor (DR-214 board), driver circuit (SS-61 board) and sensor on the PTC-68 board are normal or not. Also, check the loading FG amplifier circuit (DR-214 board), and sensor (PTC-67 board).

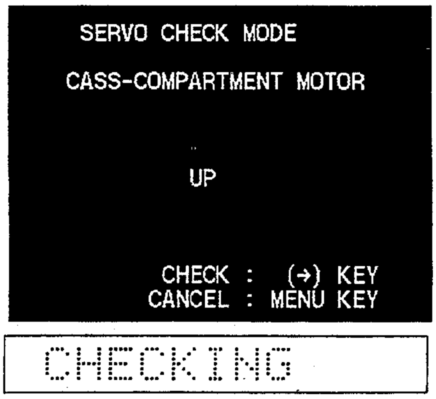


```
 SERVO CHECK MODE

THREADING MOTOR


       ..........

THREADING   : (↑) KEY
UNTHREADING : (↓) KEY


CANCEL : MENU KEY
```

```
CHECKING
```

(4) CASS-COMPARTMENT

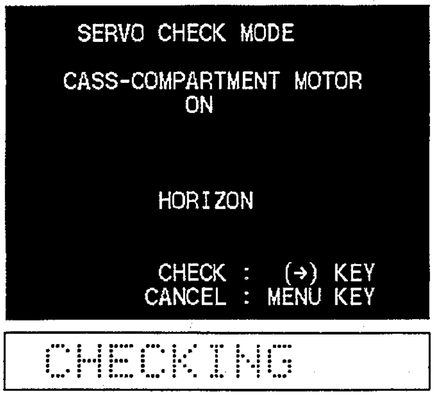
This item checks the cassette compartment motor.
Press the SET (YES) key.



```
SERVO CHECK MODE
CASS-COMPARTMENT MOTOR

UP

CHECK  :  (→) KEY
CANCEL : MENU KEY
```

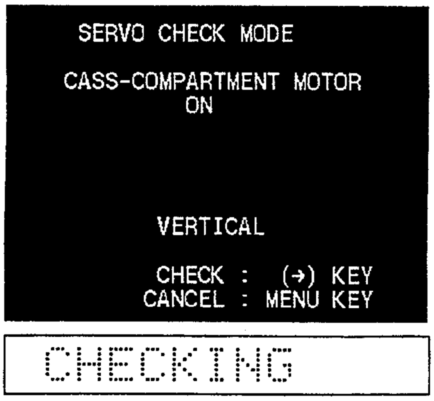
```
CHECKING
```

Press the (→) key.
Compartment goes down.
Confirm that cassette compartment goes up when pressing the (→) key.
(Compared with going case, the display on the monitor changes in the reverse order.)



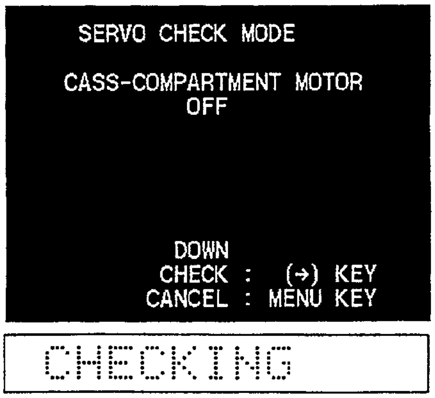
```
SERVO CHECK MODE
CASS-COMPARTMENT MOTOR
ON

HORIZON

CHECK  :  (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```



```
SERVO CHECK MODE
CASS-COMPARTMENT MOTOR
ON

VERTICAL

CHECK  :  (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```



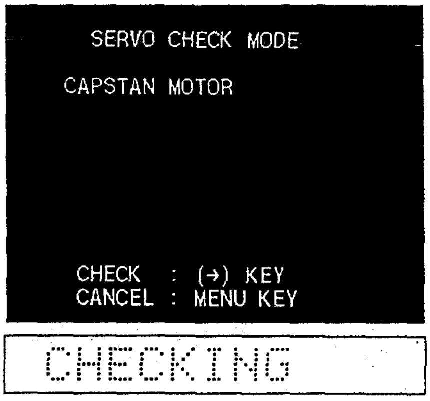
```
SERVO CHECK MODE
CASS-COMPARTMENT MOTOR
OFF

DOWN
CHECK  :  (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```

In case of NG
If the display on the monitor doesn't change, check the cassette compartment motor and the sensor input circuit (MS-39 board).

(5) CAPSTAN

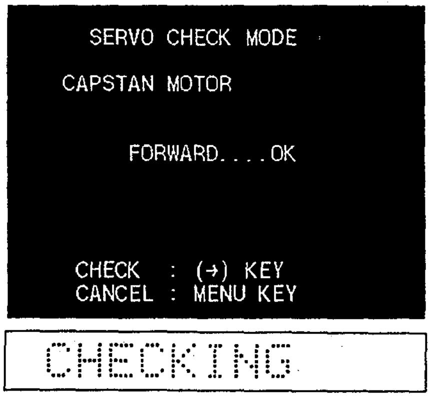
This item checks the capstan motor.
Press the SET (YES) key.



```
SERVO CHECK MODE

CAPSTAN MOTOR



CHECK  : (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```

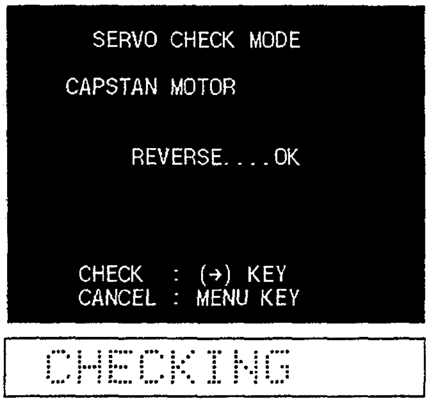
1. Press the (→) key.
   Confirm that "FORWARD...OK" is displayed on the monitor.



```
SERVO CHECK MODE

CAPSTAN MOTOR

     FORWARD....OK


CHECK  : (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```

2. Press the (→) key again.
   Confirm that "REVERSE...OK" is displayed on the monitor.



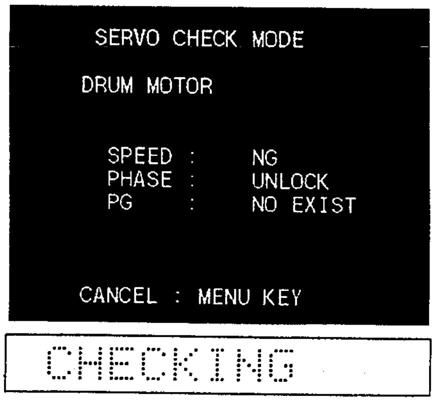
```
SERVO CHECK MODE

CAPSTAN MOTOR

     REVERSE....OK


CHECK  : (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```

In case of NG
If the display on the monitor doesn't change, check the capstan motor and the capstan motor driver circuit (DR-214 board and SS-61 board).

(6) DRUM

This item checks of the drum motor.



```
SERVO CHECK MODE
DRUM MOTOR

 SPEED :    NG
 PHASE :    UNLOCK
 PG    :    NO EXIST

CANCEL : MENU KEY
```

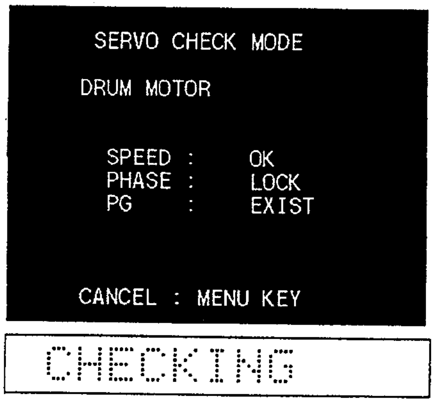
CHECKING

After selecting the SET (YES) key,

SPEED : Confirm that the display on the monitor changes into "OK".

PHASE : Confirm that the display on the monitor changes into "LOCK".

PG : Confirm that the display on the monitor changes into "EXIST".



```
SERVO CHECK MODE
DRUM MOTOR

 SPEED :    OK
 PHASE :    LOCK
 PG    :    EXIST

CANCEL : MENU KEY
```

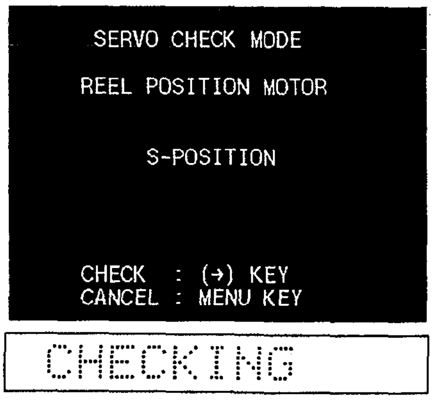
CHECKING

In case of NG

If the display on the monitor doesn't change, check the drum motor, drum motor driver circuit, drum FG amplifier circuit, and drum PG amplifier circuit (DR-214 board and SS-61 board).

(7) REEL POSITION

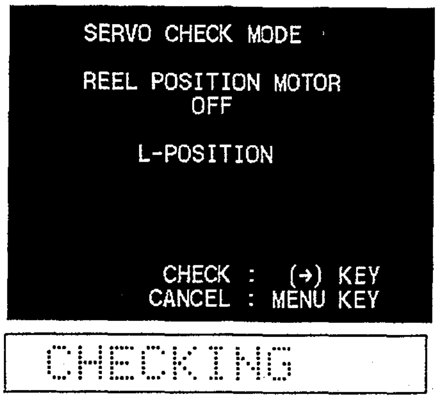
This mode checks the reel position motor and the reel L/S position sensor.



```
SERVO CHECK MODE

REEL POSITION MOTOR

S-POSITION



CHECK  : (→) KEY
CANCEL : MENU KEY
```

```
CHECKING
```

After selecting the SET (YES) key, and press the (→) key. Confirm that the reel tables moves S-position to L-position, and the display changes.



```
SERVO CHECK MODE

REEL POSITION MOTOR
       OFF

L-POSITION



     CHECK  :  (→) KEY
    CANCEL  : MENU KEY
```

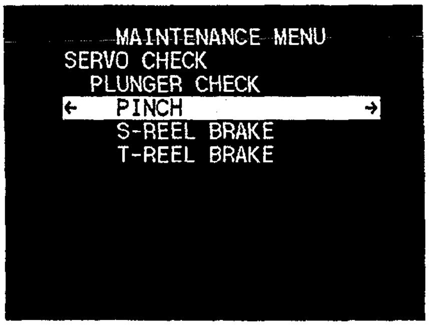
```
CHECKING
```

In case of NG

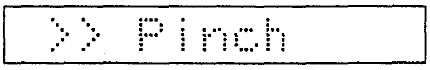
If the reel table does not move and the display on the monitor does not change, check the reel shift motor, reel L/S position sensor (MS-39 board) and reel position motor driver circuit (DR-214 board).

PLUNGER CHECK

The items of the "PLUNGER CHECK" are explained here.



```
      MAINTENANCE MENU
  SERVO CHECK
    PLUNGER CHECK
←     PINCH                →
      S-REEL BRAKE
      T-REEL BRAKE
```

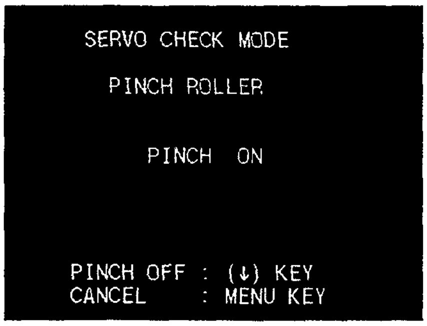


>> Pinch

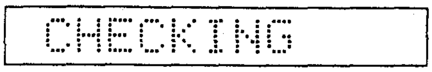
(1) PINCH

This mode checks the pinch roller solenoid.

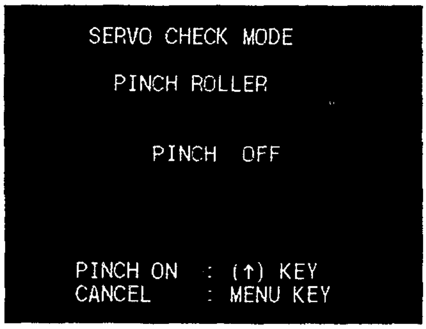
When selecting the SET (YES) key, threading takes place and the pinch solenoid is activated.
When selecting the MENU key, the pinch solenoid is released and unthreading takes place.
And the monitor returns to the menu screen.



```
   SERVO CHECK MODE

     PINCH ROLLER

         PINCH  ON



  PINCH OFF  :  (↓) KEY
  CANCEL     :  MENU KEY
```



CHECKING



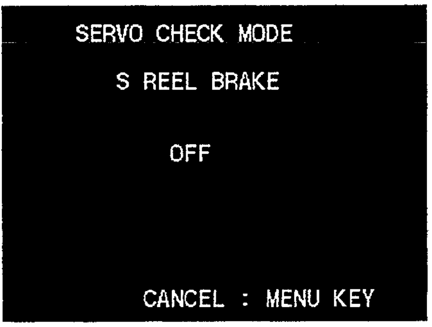
```
   SERVO CHECK MODE

     PINCH ROLLER

         PINCH  OFF



  PINCH ON   :  (↑) KEY
  CANCEL     :  MENU KEY
```

(2) S-REEL BRAKE

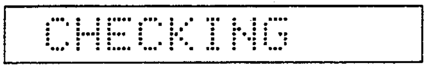
This item checks of the S reel brake solenoid.

1. Press the SET (YES) key.
   S-reel brake solenoid is activated.
2. Press the MENU key.
   Then S-reel brake solenoid is released.
   And the monitor returns to the menu screen.

In case of NG
If the S brake solenoid does not make the actuating sound, and monitor does not change, check the S-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



SERVO CHECK MODE
S REEL BRAKE
OFF
CANCEL : MENU KEY

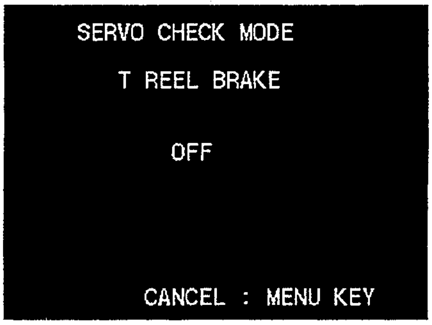


CHECKING

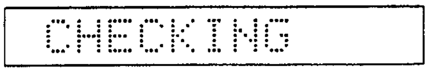
(3) T-REEL BRAKE

This mode checks of the T reel brake solenoid.

1. Press the SET (YES) key.
   T-reel brake solenoid is activated.
2. Press the MENU key.
   Then T-reel brake solenoid is released.
   And the monitor returns to the menu screen.



SERVO CHECK MODE
T REEL BRAKE
OFF
CANCEL : MENU KEY



CHECKING

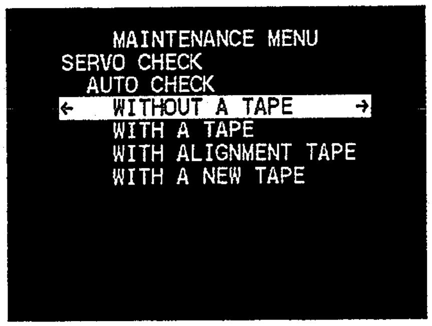
In case of NG
If the T brake solenoid does not make the actuating sound, and monitor does not change, check the T-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).

AUTO CHECK

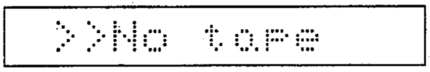
This is the function to automatically check whether the unit operates normally or not. The check stops as soon as an error occurs during checking.

Press the (→) key to enter the diagnosis.

(1) WITHOUT A TAPE



```
      MAINTENANCE MENU
   SERVO CHECK
     AUTO CHECK
←      WITHOUT A TAPE      →
       WITH A TAPE
       WITH ALIGNMENT TAPE
       WITH A NEW TAPE
```



```
>>No tape
```

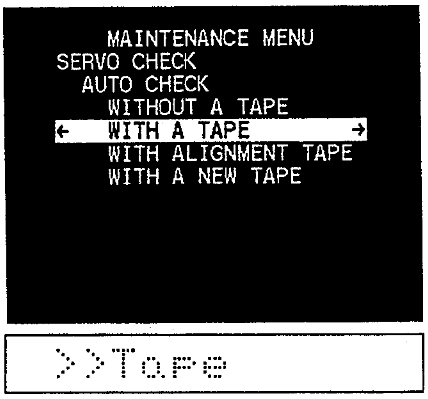
Checks the motors, plunger and sensors individually. The checks are performed in the following orders. They takes about 4 to 5 minutes in all.

1. Sensor Check
   Checks whether the following sensors operates correctly in cassette-out condition.

   - The reel hub size sensor should be "LARGE".
   - The oxide/metal sensor should be "METAL".
   - The cassette in sensors 1 and 2 should be "cassette out".
   - The cassette size sensor should be "SMALL".
   - The tape top sensor should be "OFF".
   - The tape end sensor should be "OFF".
   - The humidity sensor should be "DRY".
   - The small cassette MISS-REC sensor should be "ON". (only for recorders)
   - The large cassette MISS-REC sensor should be "ON". (only for recorders)

2. Cassette Compartment Operation Check
3. Reel Table Shift Operation Check
4. S Reel Motor/Brake Solenoid Operation Check
5. T Reel Motor/Brake Solenoid Operation Check
6. Drum Motor Operation Check
7. Threading Operation Check
8. Pinch Roller Solenoid Operation Check
9. Unthreading Operation Check
10. Capstan Motor Operation Check

(2) WITH A TAPE


MAINTENANCE MENU
SERVO CHECK
AUTO CHECK
WITHOUT A TAPE
← WITH A TAPE →
WITH ALIGNMENT TAPE
WITH A NEW TAPE
>>Tape

Using a blank tape, checks the typical operation.
The check is performed in the following order. It takes about 4 to 5 minutes by using a small tape and about 8 to 9 minutes by using a large tape.

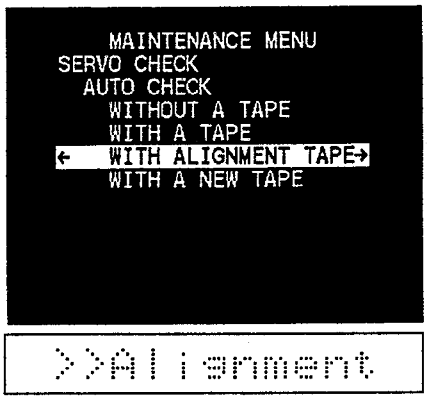
small tape (30 minutes)

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. play
6. search fwd x1/30, x1/2, x1, x5
7. search rev x1/30, x1/2, x1, x5
8. ff top → end
9. rew end → top
10. unthreading
11. cassette up

large tape (90 minutes)

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. play
6. search fwd x1/30, x1/2, x1, x5
7. search rev x1/30, x1/2, x1, x5
8. ff top → end
9. rew end → top
10. unthreading
11. cassette up

(3) WITH AN ALIGNMENT TAPE


MAINTENANCE MENU
SERVO CHECK
AUTO CHECK
WITHOUT A TAPE
WITH A TAPE
← WITH ALIGNMENT TAPE→
WITH A NEW TAPE
>>Alignment

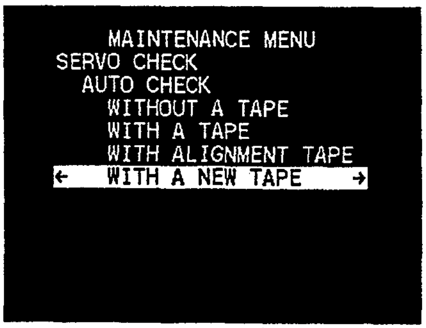
Using an alignment tape (CR2-1B or CR2-1B PS), checks the PB servo system.
The check is performed in the following order. It takes about one minute.

1. cassette down
2. threading
3. stop
4. ctl lock check
5. capstan speed check
6. switching position adjustment check
7. unthreading
8. cassette up

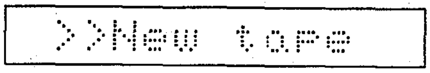
(4) WITH A NEW TAPE (only for recorders)

Using a non-recorded tape, checks recording and playing back of CTL and TIME CODE.
The check is performed in the following order. It takes about one and a half minute.

1. cassette down
2. threading
3. stop
4. rew (→ tape top)
5. rec
6. rew (→ tape top)
7. play
8. ctl lock check
9. capstan speed check1
10. capstan speed check2
    The data is compared to those from checking at using an alignment tape in order to check whether the unit records at the proper tape speed or not. Therefore, perform this check as soon as performing (3) WITH AN ALIGNMENT TAPE.
11. time code check
12. unthreading
13. cassette up



```
    MAINTENANCE MENU
SERVO CHECK
  AUTO CHECK
    WITHOUT A TAPE
    WITH A TAPE
    WITH ALIGNMENT TAPE
←   WITH A NEW TAPE    →
```



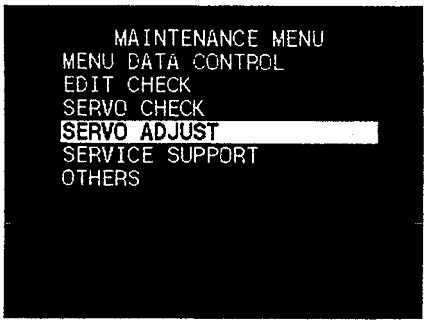
```
>>New tape
```

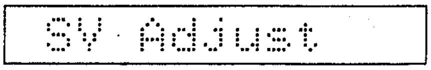
4-5. SERVO ADJUST

Servo system is adjusted automatically or semiautomatically in this menu.

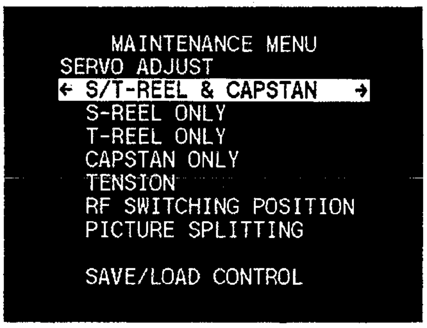
[Procedure]

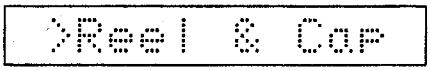
1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.


MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS

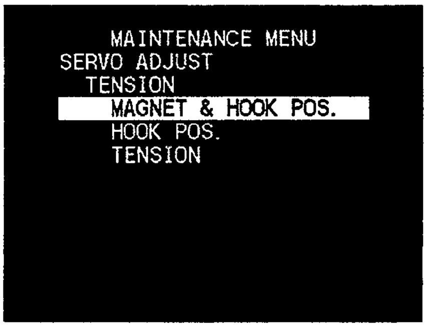


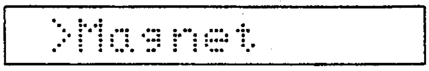
3. Press the (→) key.
   Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.


MAINTENANCE MENU
SERVO ADJUST
← S/T-REEL & CAPSTAN →
S-REEL ONLY
T-REEL ONLY
CAPSTAN ONLY
TENSION
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL



4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.
   Then the menus of the lower level are displayed.


MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
TENSION



6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item. (Refer to each page of item about a method of adjustment.)
8. When adjustment is finished, press the MENU key to return to the menu picture. Or, press the (←) key to return to the MENU key.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When all the checks are performed, the adjustment data is saved in EEPROM by executing the "SAVE/LOAD CONTROL".

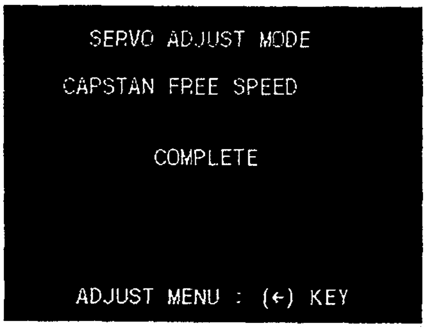
Note : When one item of adjustment is completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL". When items of more than two adjustments are completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL".
Never turn off the power in the adjustment. If the power is turned off in the adjustment, the adjustment data will be erased.

11. When closing the maintenance menu, press the MENU key.

Note : When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.

S/T REEL & CAPSTAN

Adjustment related to S-reel, T-reel and capstan are performed automatically.
Confirm that adjustment is performed, and "COMPLETE" is displayed.

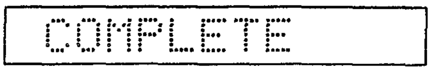


SERVO ADJUST MODE

CAPSTAN FREE SPEED

COMPLETE

ADJUST MENU : (←) KEY



COMPLETE

Items of adjustment

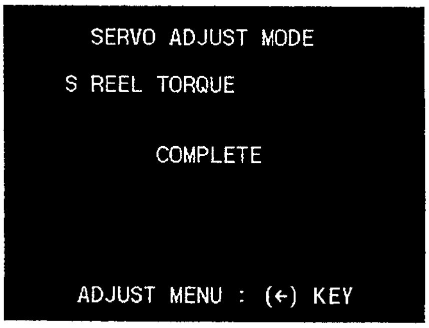
s reel fg check
s reel offset/friction
s reel torque
t reel fg check
t reel offset/friction
t reel torque
capstan fg duty
capstan free speed

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit, the capstan motor driver circuit and the capstan FG amplifier circuit (DR-214 board, SS-61 board).

S-REEL ONLY

Adjustment related to S-reel are performed automatically. Confirm that adjustment is performed, and "COMPLETE" is displayed.

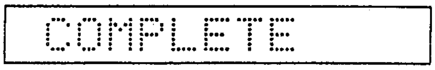


SERVO ADJUST MODE

S REEL TORQUE

COMPLETE

ADJUST MENU : (←) KEY



COMPLETE

Items of adjustment

s reel fg check
s reel offset/friction
s reel torque

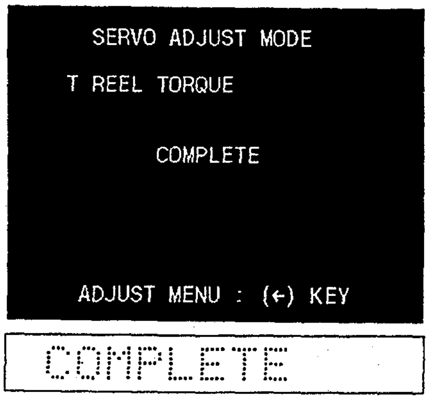
When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-61 board).

T-REEL ONLY

Adjustment related to T-reel are performed automatically. Confirm that adjustment is performed, and "COMPLETE" is displayed.



SERVO ADJUST MODE

T REEL TORQUE

COMPLETE

ADJUST MENU : (←) KEY

COMPLETE

Items of adjustment

- t reel fg check
- t reel offset/friction
- t reel torque

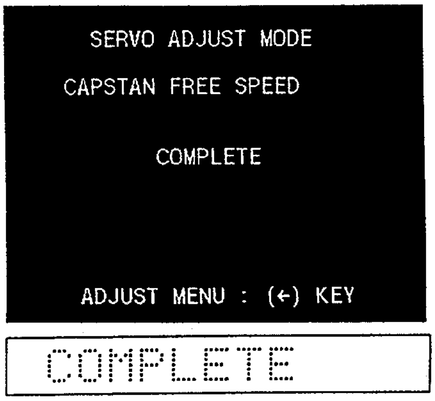
When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-61 board).

CAPSTAN ONLY

Adjustment related to capstan are performed automatically. Confirm that adjustment is performed, and "COMPLETE" is displayed.



SERVO ADJUST MODE

CAPSTAN FREE SPEED

COMPLETE

ADJUST MENU : (←) KEY

COMPLETE

Items of adjustment

- capstan fg duty
- capstan free speed

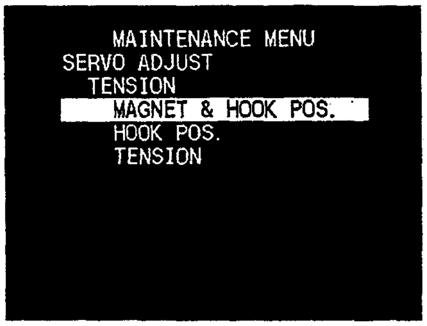
When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the capstan motor driver circuit (DR-214 board and SS-53 board) and the capstan FG amplifier circuit (SS-61 board).

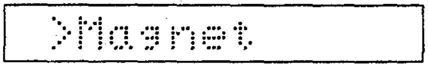
TENSION

The item "TENSION" are explained here.



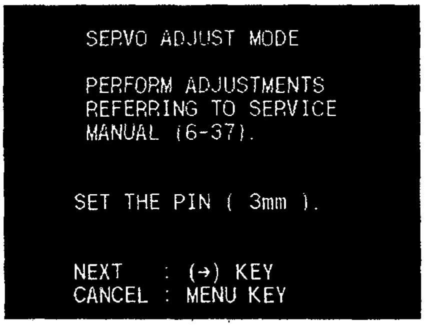
```
   MAINTENANCE MENU
SERVO ADJUST
  TENSION
    MAGNET & HOOK POS.
    HOOK POS.
    TENSION
```

(1) MAGNET & HOOK POS



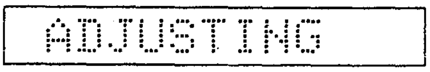
```
>Magnet
```

Tension regulator magnet adjustment and hook position adjustment.
* Refer to section 6-37.



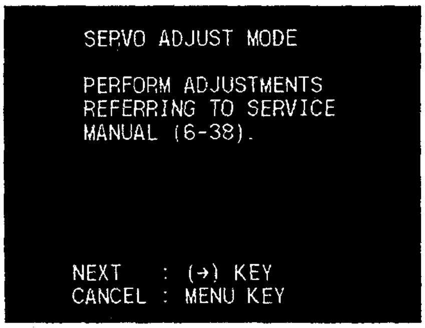
```
 SERVO ADJUST MODE

 PERFORM ADJUSTMENTS
 REFERRING TO SERVICE
 MANUAL (6-37).


SET THE PIN ( 3mm ).


NEXT   : (→) KEY
CANCEL : MENU KEY
```

(2) HOOK POS



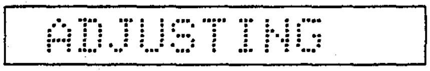
```
ADJUSTING
```

Tension regulator hook position adjustment only.
* Refer to section 6-38.



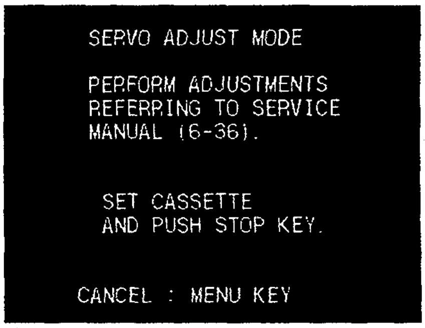
```
 SERVO ADJUST MODE

 PERFORM ADJUSTMENTS
 REFERRING TO SERVICE
 MANUAL (6-38).




NEXT   : (→) KEY
CANCEL : MENU KEY
```

(3) TENSION

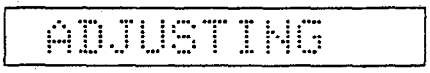


```
ADJUSTING
```

Tension adjustment using Tentelometer.
* Refer to section 6-36.



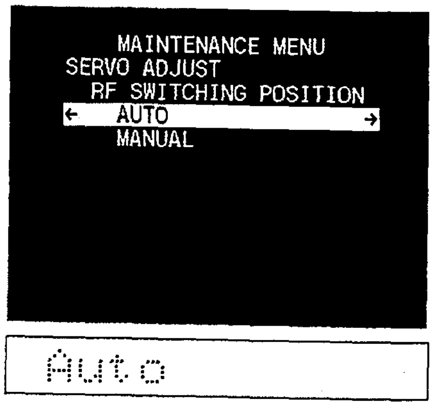
```
 SERVO ADJUST MODE

 PERFORM ADJUSTMENTS
 REFERRING TO SERVICE
 MANUAL (6-36).


  SET CASSETTE
  AND PUSH STOP KEY.


CANCEL : MENU KEY
```



```
ADJUSTING
```

RF SWITCHING POSITION

The sub menus of the "RF SWITCHING POSITION" are explained here.



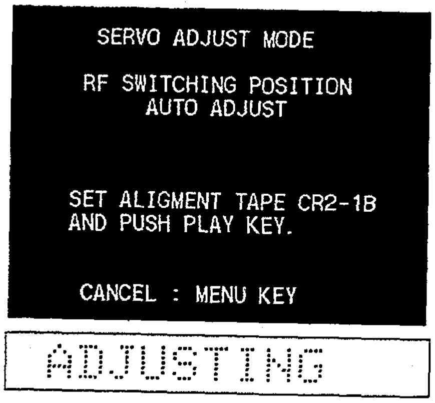
```
      MAINTENANCE MENU
   SERVO ADJUST
     RF SWITCHING POSITION
←     AUTO                 →
      MANUAL
```

```
Auto
```

(1) AUTO

This mode adjusts the RF switching position automatically. Insert an alignment tape CR2-1B, and press the play button.

Note : Be sure to use the alignment tape CR2-1B.
Do not use other alignment tape.



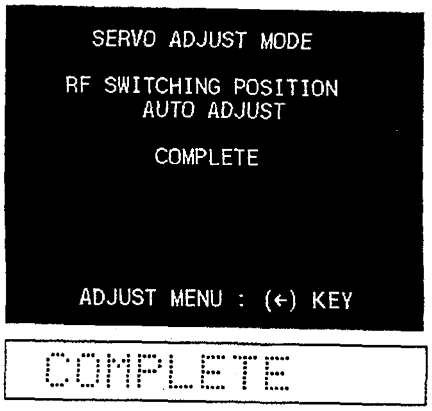
```
     SERVO ADJUST MODE

   RF SWITCHING POSITION
        AUTO ADJUST


  SET ALIGMENT TAPE CR2-1B
  AND PUSH PLAY KEY.

   CANCEL : MENU KEY
```

```
ADJUSTING
```

Confirm that adjustment is performed, and "COMPLETE" is displayed.
The cassette tape eject automatically.

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check that the playbacked alignment tape was CR2-1B (CR2-1B PS) or not. And check the DO pulse circuit.



```
     SERVO ADJUST MODE

   RF SWITCHING POSITION
        AUTO ADJUST

         COMPLETE



   ADJUST MENU : (←) KEY
```

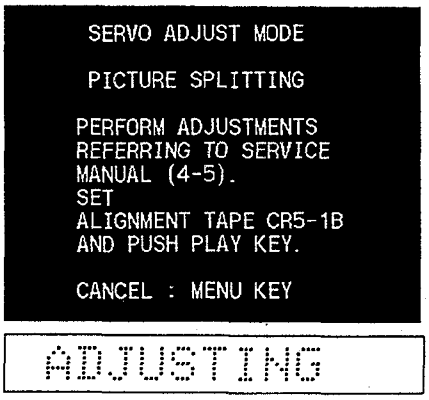
```
COMPLETE
```

(2) MANUAL

This mode adjusts the RF switching position manually.
* Refer to section 7-13.

PICTURE SPLITTING

This mode adjusts the picture splitting.



```
SERVO ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (4-5).
SET
ALIGNMENT TAPE CR5-1B
AND PUSH PLAY KEY.

CANCEL : MENU KEY
```

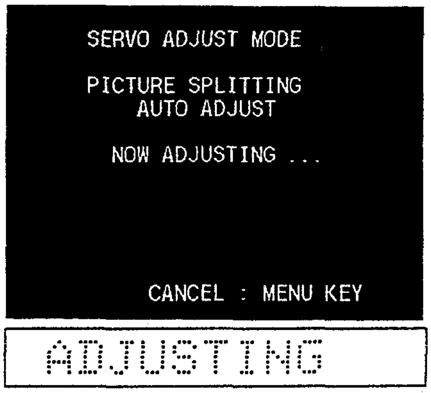
```
ADJUSTING
```

> **Note :** Before performing this adjustment, be sure to set an alignment tape CR5-1B/CR5-1B PS to the timecode, 8:00.
> For adjustment, the portion between 8:00 and 26:00 on the tape is used.
> Do not use the portions of 8:00 and former and 26:00 and later on the tape, because the adjustment cannot be performed correctly.

Select AUTO or MANUAL from the monitor display.

(1) AUTO

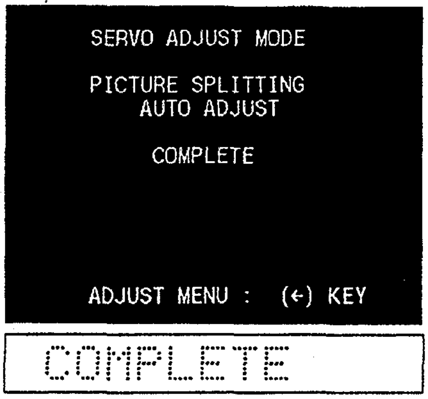
The adjustment are performed automatically.
As prescribed on the monitor display, insert the alignment tape CR5-1B (CR5-1B PS) with set to 8:00. Then, press the PLAY key.



```
SERVO ADJUST MODE

PICTURE SPLITTING
    AUTO ADJUST

  NOW ADJUSTING ...



     CANCEL : MENU KEY
```

```
ADJUSTING
```

Confirm the adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST MODE

PICTURE SPLITTING
    AUTO ADJUST

     COMPLETE



ADJUST MENU :  (←) KEY
```

```
COMPLETE
```

When "COMPLETE" is displayed, execute the "SAVE ADJUSTING DATA" to memorize the adjusting data in EEPROM after executing the "SAVE/LOAD CONTROL".

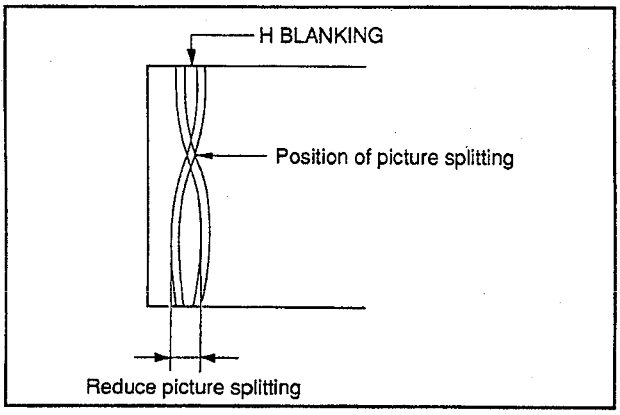
(2) MANUAL

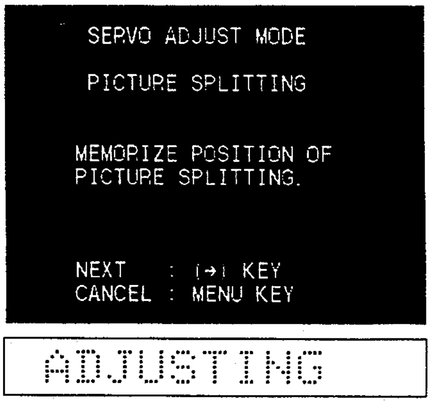
1. Connect the video monitor to TP201 on the VP-44 board using the clip cable.

   * Set the monitor as following.
   - H DELAY
   - AFC FAST
   - INT SYNC

Note : It is impossible to observe picture splitting with the video monitor which captured the H sync strongly by the AFC circuit in the monitor.

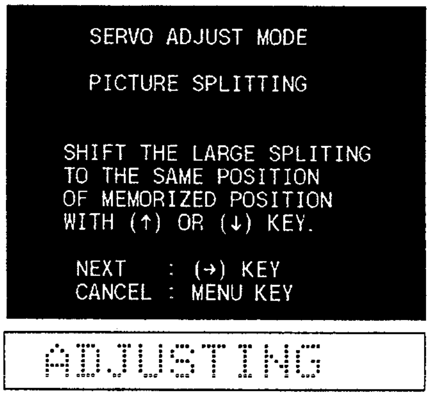
2. Make adjustment according to the instruction shown on screen.





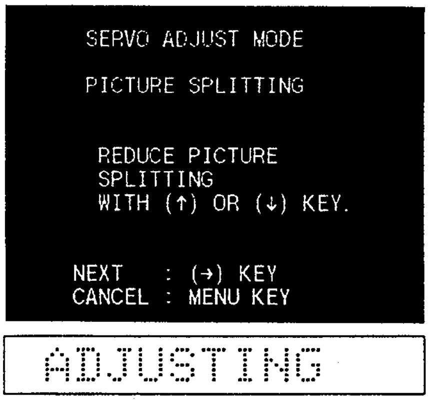
```
SERVO ADJUST MODE

PICTURE SPLITTING

MEMORIZE POSITION OF
PICTURE SPLITTING.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

```
ADJUSTING
```



```
SERVO ADJUST MODE

PICTURE SPLITTING

SHIFT THE LARGE SPLITING
TO THE SAME POSITION
OF MEMORIZED POSITION
WITH (↑) OR (↓) KEY.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

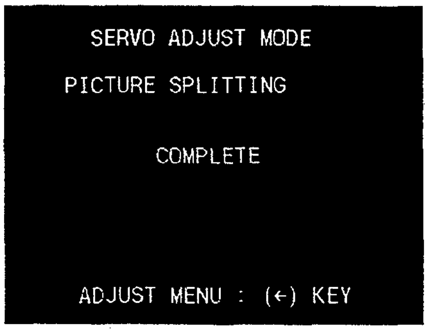
```
ADJUSTING
```



```
SERVO ADJUST MODE

PICTURE SPLITTING

REDUCE PICTURE
SPLITTING
WITH (↑) OR (↓) KEY.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

```
ADJUSTING
```

3. Confirm that adjustment is performed and “COMPLETE” is displayed.

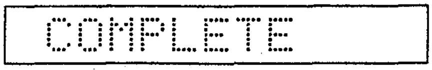


SERVO ADJUST MODE

PICTURE SPLITTING

COMPLETE

ADJUST MENU : (←) KEY

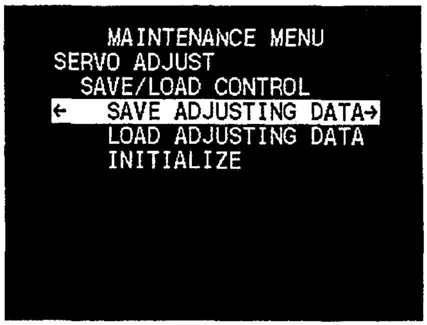


COMPLETE

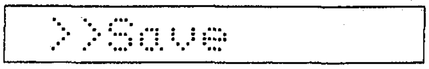
When “COMPLETE” is displayed, execute the “SAVE ADJUSTING DATA” to memorize the adjusting data in EEPROM after executing the “SAVE/LOAD CONTROL”.

SAVE/LOAD CONTROL

The sub menus of the "SAVE/LOAD CONTROL" are explained here.



```
      MAINTENANCE MENU
  SERVO ADJUST
    SAVE/LOAD CONTROL
←     SAVE ADJUSTING DATA→
      LOAD ADJUSTING DATA
      INITIALIZE
```

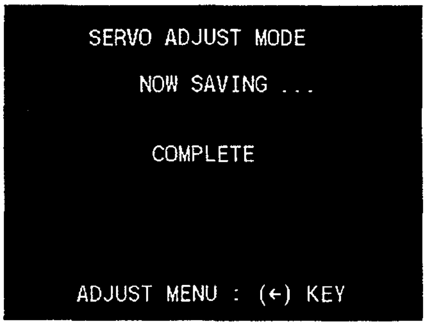


```
>>Save
```

(1) SAVE ADJUSTING DATA

Save the adjustment data in EEPROM.
Confirm that Save is performed, and "COMPLETE" is displayed.

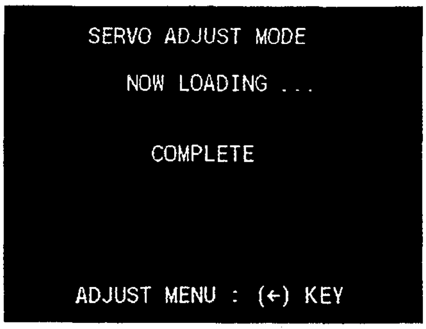
Note : After adjustment is completed, make sure to save in this mode.



```
     SERVO ADJUST MODE
        NOW SAVING ...

         COMPLETE


  ADJUST MENU : (←) KEY
```

(2) LOAD ADJUSTING DATA

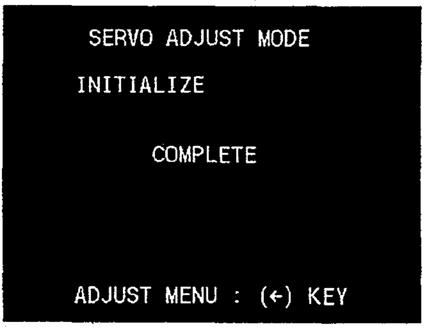
Load the adjustment data in EEPROM.
Confirm that Load is performed, and "COMPLETE" is displayed.



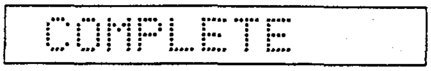
```
     SERVO ADJUST MODE
       NOW LOADING ...

         COMPLETE


  ADJUST MENU : (←) KEY
```

(3) INITIALIZE

Perform this item only when either MS-39 board or microcomputer on the MS-39 board is exchanged.
Load the Initial data of adjustment data from ROM.
Load the initial data of the adjustment data from ROM.
Confirm that Initialize is performed, and "COMPLETE" is displayed.



```
     SERVO ADJUST MODE
  INITIALIZE

         COMPLETE


  ADJUST MENU : (←) KEY
```



```
COMPLETE
```

4-6. SERVICE SUPPORT

Overview of self-diagnosis function

Servo and mechanical control systems process software in microprocessors, and make a judgement about errors by various informations. As a result, we consider that only to display the error codes is not enough information to analyze the probable cause which an error occurs. Especially, when occurring the non-repeatable error, it is very difficult to judge where we would check. For improving the efficiency of service, we have studied how to shorten the time which customers are inconvenient. From the study, we conclude that the following functions are on board of the unit.

(1) The unit carries out an analysis from the data when the error has occurred. As a result of the analysis, the probable blocks with troubled are specified.

(2) For every block, the unit diagnoses itself as much as possible. When needing the assistance of a person, the unit focuses the troubled portion with proceeding the diagnosis in an interactive manner from the characters on the monitor display.

(3) The unit automatically checks that the operations of devices and tape path system are normally performed or not.

(4) The unit diagnoses whether any error is occurred on the individual device or not.
The previous "SERVO CHECK" operates the individual device only, but does not diagnose the device.
As the consistency of "SERVICE SUPPORT", we add the diagnosis functions for the individual device.
From this addition, the previous "SERVO CHECK" function might not be necessary, but we decide that the function is preserved by dividing the purposes at using into the followings.

Purpose of "SERVICE SUPPORT"
Checks that the individual device operates normally.
Detects the device which an error occurs.

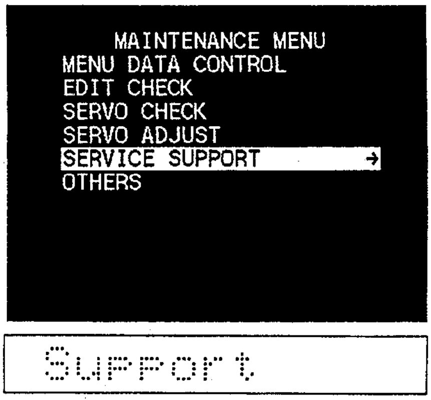
Purpose of "SERVO CHECK"
Checks the operation of the individual device. In checking, measures the waveform and so on.
This is used for various adjustments and checks.

(5) "ERROR LOG CLEAR"
The previous "ERROR LOG CLEAR" could not reset the ERROR LOGs which had occurred previously. The unit could not be decided the ERROR LOGs which were remained in the software had been repaired or not.
Therefore, we add a reset function.

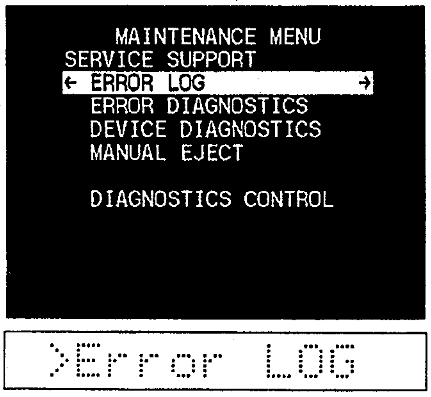
This item has the functions to display and diagnose the errors and the error codes that have occurred in the past and also the function to diagnose the devices. Furthermore, this has the function to clear the ERROR LOG.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVICE SUPPORT" on the monitor display using the (↑), (↓) keys.


MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT →
OTHERS
Support

3. Press the (→) key.
   Then "SERVICE SUPPORT" is selected, and the menu of the lower level is displayed.


MAINTENANCE MENU
SERVICE SUPPORT
← ERROR LOG →
ERROR DIAGNOSTICS
DEVICE DIAGNOSTICS
MANUAL EJECT
DIAGNOSTICS CONTROL
>Error LOG

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.
   Then the menus of the lower level are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.
   (Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

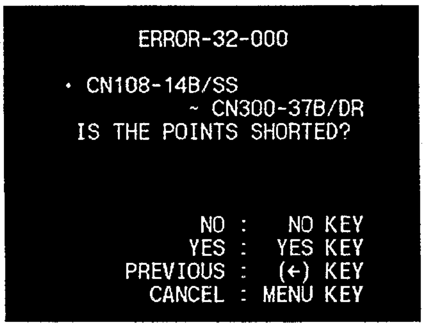
To suspend the diagnosis temporarily

In the following cases, be sure to save the result of the diagnosis until the diagnosis is suspended.

- In the case that continuing the diagnosis after suspending the diagnosis.
- In the case that turning off the power during diagnosing depending on the diagnosis items.

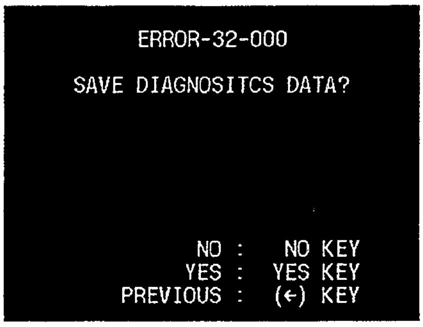
[How to operate]

1. Press the MENU key when the display with suspending the diagnosis is indicated.



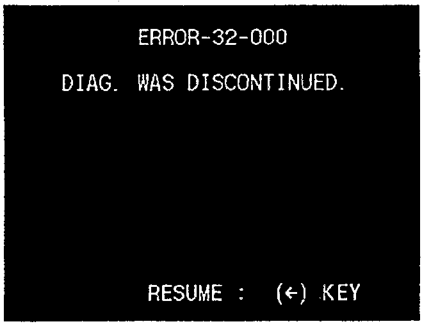
```
         ERROR-32-000

  · CN108-14B/SS
               ~ CN300-37B/DR
   IS THE POINTS SHORTED?


                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

2. Press the YES key to save the data of the diagnosis.



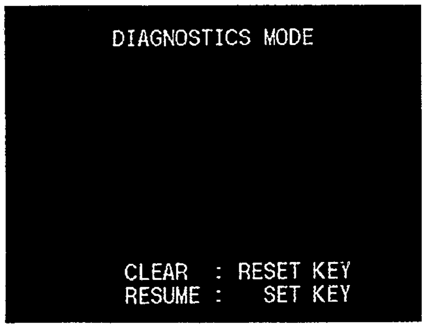
```
         ERROR-32-000

   SAVE DIAGNOSITCS DATA?


                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
```

3. When "DIAG. WAS DISCONTINUED." is displayed, turn off the power and perform some repair jobs to be necessary.

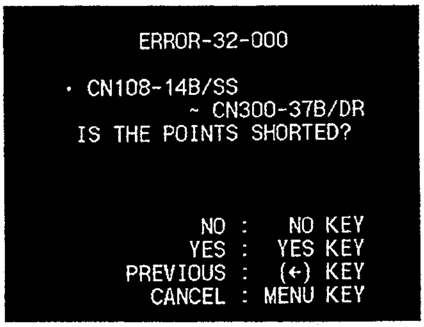


```
         ERROR-32-000

 DIAG. WAS DISCONTINUED.


            RESUME :  (←) KEY
```

4. After completing the repair jobs, turn on the power again. Then, press the SET key to continue the diagnosis.



```
      DIAGNOSTICS MODE


          CLEAR  : RESET KEY
          RESUME :   SET KEY
```



```
         ERROR-32-000

  · CN108-14B/SS
               ~ CN300-37B/DR
   IS THE POINTS SHORTED?


                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

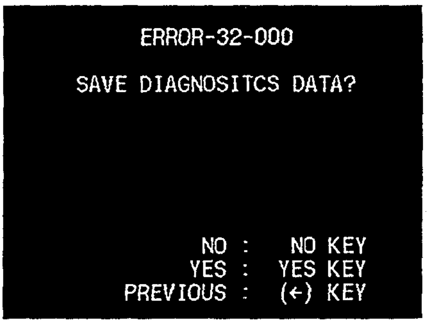
> **Note :** When turning off the power once, be sure to save the data of the diagnosis.
> If not, the diagnosis cannot be continued.

To abort the diagnosis during diagnosing

The diagnosis is aborted during diagnosing.

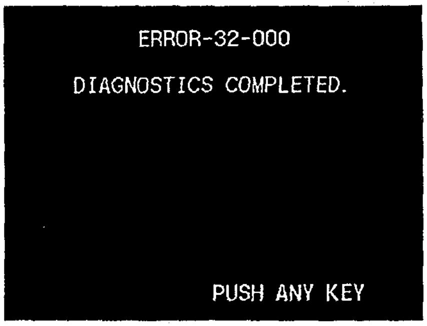
[How to operate]

1. Press the MENU key when any display is indicated.
2. Press the NO key to stop saving the data.



```
        ERROR-32-000

   SAVE DIAGNOSITCS DATA?




             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
```

3. Abort the diagnosis.



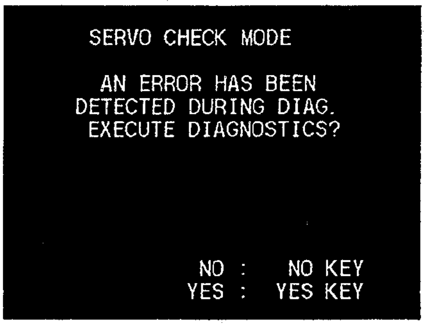
```
        ERROR-32-000

   DIAGNOSTICS COMPLETED.




                PUSH ANY KEY
```

When a new error is occurred during diagnosing

When a new error is occurred during diagnosing, diagnosing the new error takes priority over now-diagnosing. Therefore, the unit stops the now-diagnosing.
First, the unit diagnoses the new error. Then, if necessary, the unit diagnoses the last diagnosis again.

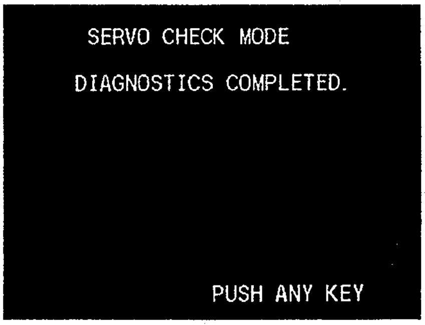
[How to operate]

1. Press the YES key to diagnose the new error.



```
SERVO CHECK MODE

  AN ERROR HAS BEEN
DETECTED DURING DIAG.
 EXECUTE DIAGNOSTICS?



              NO  :   NO KEY
              YES :   YES KEY
```

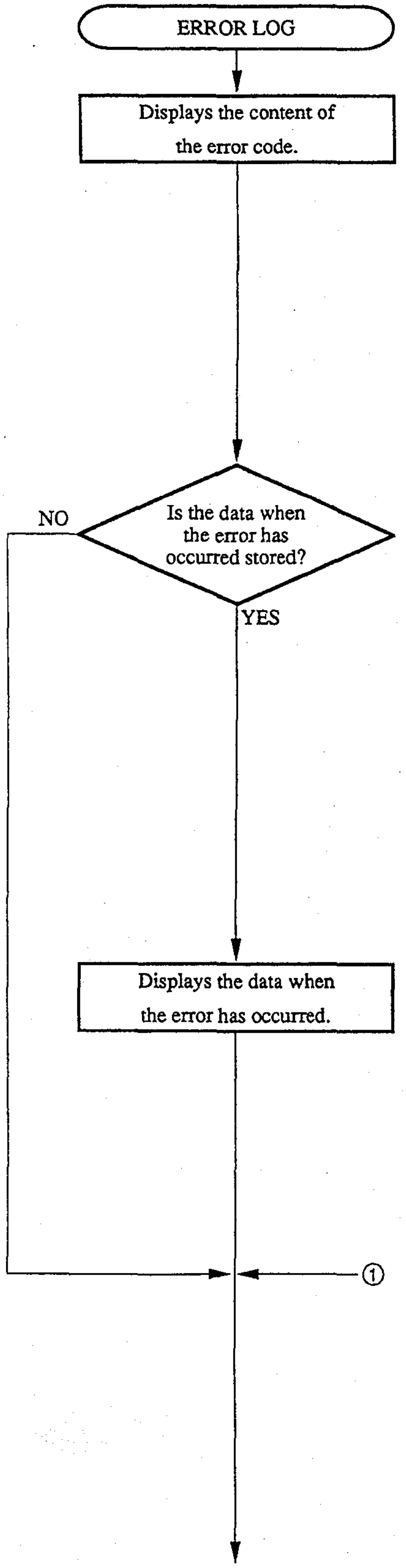
2. After completing the diagnosis of the new error, perform the last diagnosis with gone back to the first step if necessary.

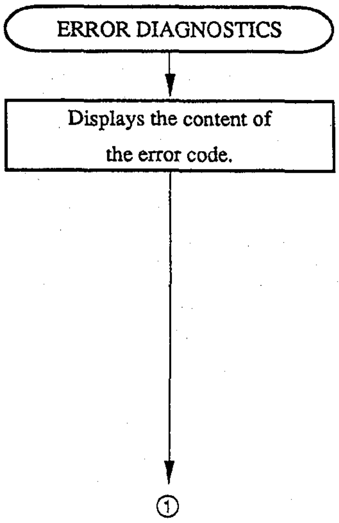


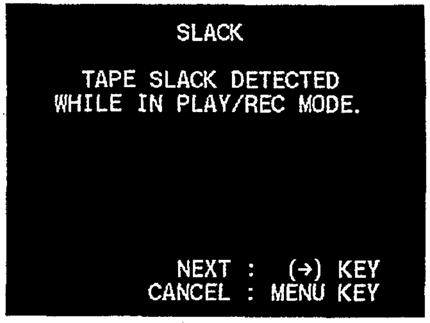
```
SERVO CHECK MODE

DIAGNOSTICS COMPLETED.




                 PUSH ANY KEY
```

ERROR LOG

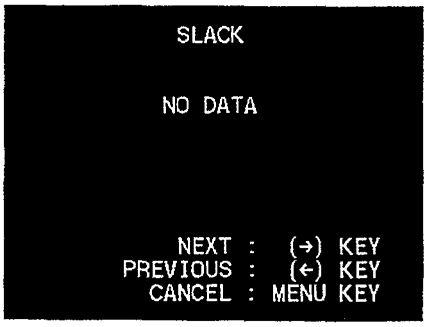
ERROR DIAGNOSTICS


ERROR LOG
Displays the content of the error code.
Is the data when the error has occurred stored?
NO
YES
Displays the data when the error has occurred.
①


ERROR DIAGNOSTICS
Displays the content of the error code.
①

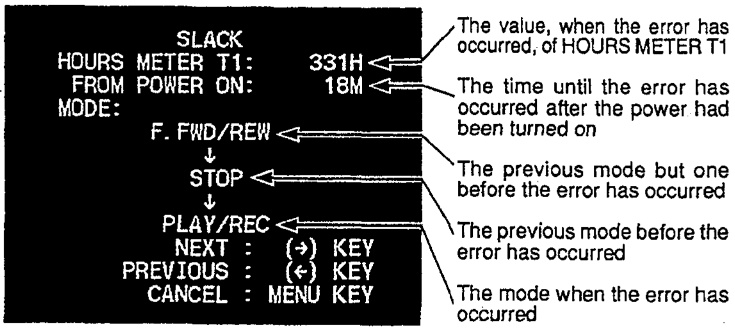


```
SLACK

TAPE SLACK DETECTED
WHILE IN PLAY/REC MODE.



          NEXT :   (→) KEY
        CANCEL : MENU KEY
```



```
SLACK

NO DATA



            NEXT :   (→) KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```

- Maximum two data of the errors that have occurred are stored from the most recent one.
  However, the data are not stored when the power is turned off while saving the data.



```
              SLACK
 HOURS METER T1:      331H
   FROM POWER ON:      18M
 MODE:
           F. FWD/REW
                ↓
               STOP
                ↓
             PLAY/REC
            NEXT :   (→) KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```

The value, when the error has occurred, of HOURS METER T1

The time until the error has occurred after the power had been turned on

The previous mode but one before the error has occurred

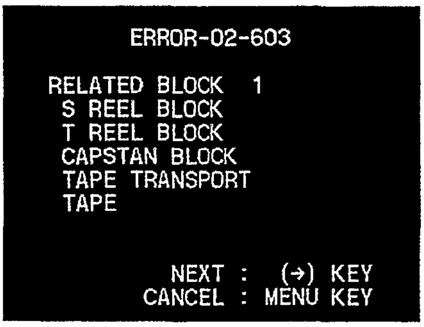
The previous mode before the error has occurred

The mode when the error has occurred

Continues to the next page.

Displays the probable blocks with troubled

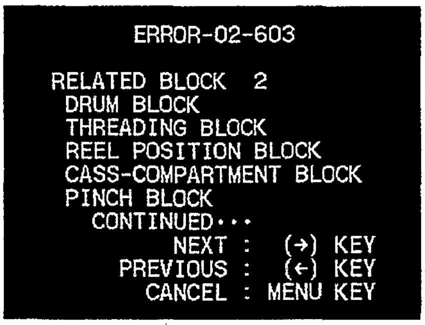
- The unit carries out an analysis from the data when the error has occurred. As a result of the analysis, the probable blocks with troubled are divided into two blocks.



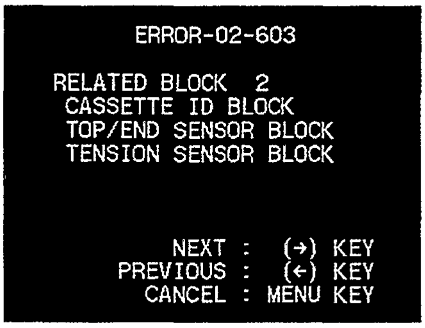
```
          ERROR-02-603

   RELATED BLOCK   1
    S REEL BLOCK
    T REEL BLOCK
    CAPSTAN BLOCK
    TAPE TRANSPORT
    TAPE


            NEXT :   (→) KEY
          CANCEL : MENU KEY
```

(1) RELATED BLOCK 1

······Highly probable blocks with troubled



```
          ERROR-02-603

   RELATED BLOCK   2
    DRUM BLOCK
    THREADING BLOCK
    REEL POSITION BLOCK
    CASS-COMPARTMENT BLOCK
    PINCH BLOCK
      CONTINUED···
            NEXT :   (→) KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```



```
          ERROR-02-603

   RELATED BLOCK   2
    CASSETTE ID BLOCK
    TOP/END SENSOR BLOCK
    TENSION SENSOR BLOCK


            NEXT :   (→) KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```

(2) RELATED BLOCK 2

······Probable blocks with troubled

- In the following cases, RELATED BLOCK 1 are not displayed.

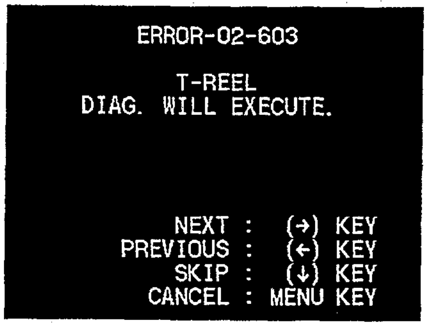
(1) In the case that the most highly probable blocks cannot be specified from the data when the error has occurred.
(2) In the case that the data when the error has occurred is not stored.
(3) In the case that the diagnosis is run by ERROR DIAGNOSTICS.

- When TAPE TRANSPORT or TAPE is displayed on the RELATED BLOCKs, the probable cause is that the tape clings to tape path system and drum.
  In the case that a cassette tape is in the unit, check that the tape clings to the drum, capstan, heads, tape guides and so on or not. Then, take out the cassette tape.
  In the case of using the cassette tape when the error has occurred, check that something attaches to the tape or not.

②

Checks the probable blocks with troubled.

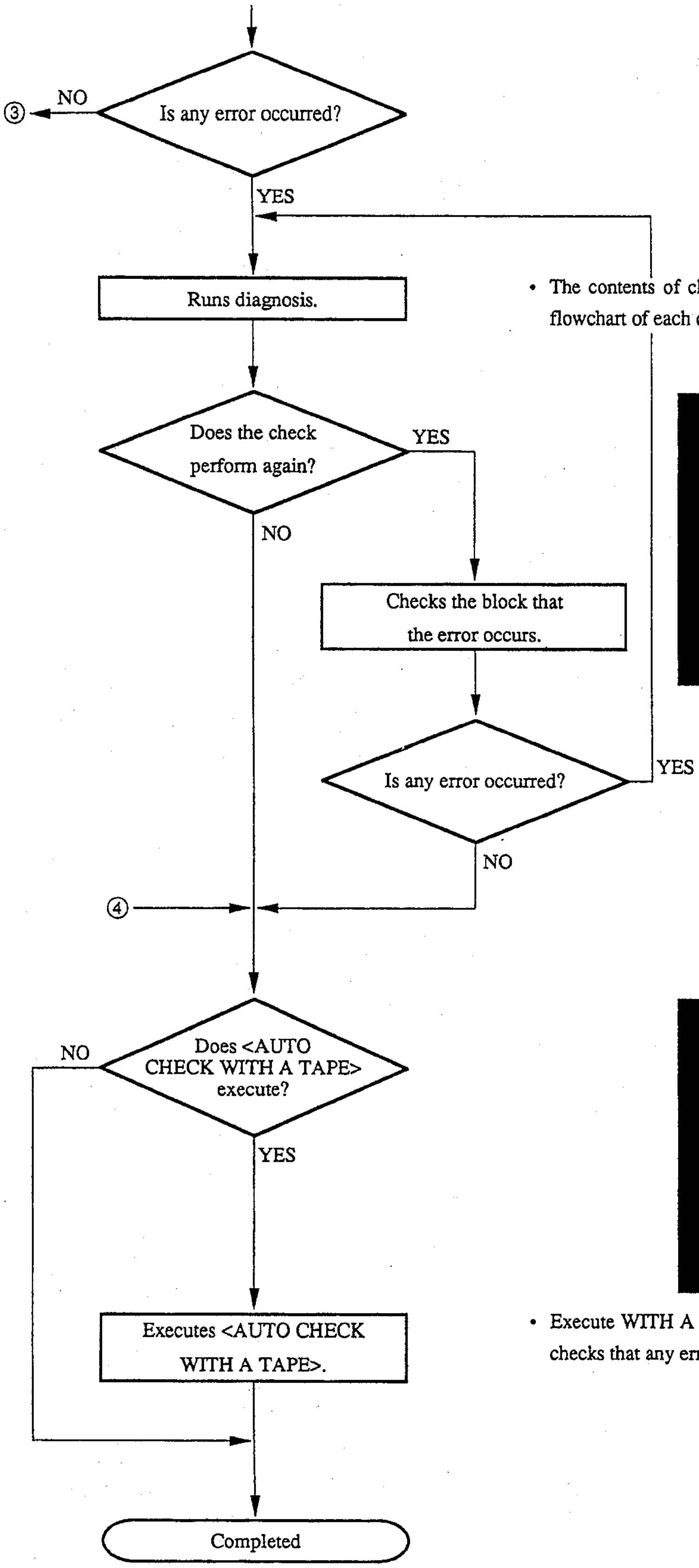
- Checks each block in order.
  The contents of check are different from each device. For details, refer to the flowchart of each device.



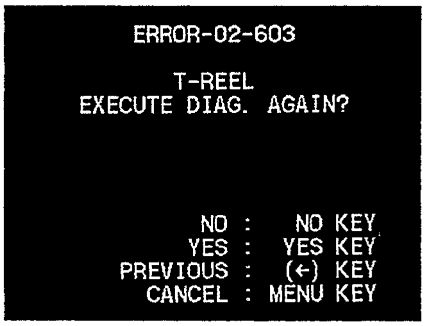
```
        ERROR-02-603

           T-REEL
     DIAG. WILL EXECUTE.



        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
        SKIP :   (↓) KEY
      CANCEL : MENU KEY
```

- Press the (→) key to enter the unit into diagnosis function.
  Press the (←) key to return the picture to the previous picture.
  Press the (↓) key to skip the block that is diagnosed once.

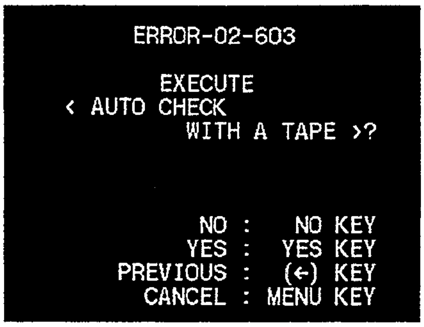
Continues to the next page.


③
NO
Is any error occurred?
YES
Runs diagnosis.
Does the check perform again?
YES
NO
Checks the block that the error occurs.
Is any error occurred?
YES
NO
④
NO
Does <AUTO CHECK WITH A TAPE> execute?
YES
Executes <AUTO CHECK WITH A TAPE>.
Completed

- The contents of check are different from each device. For details, refer to the flowchart of each device.

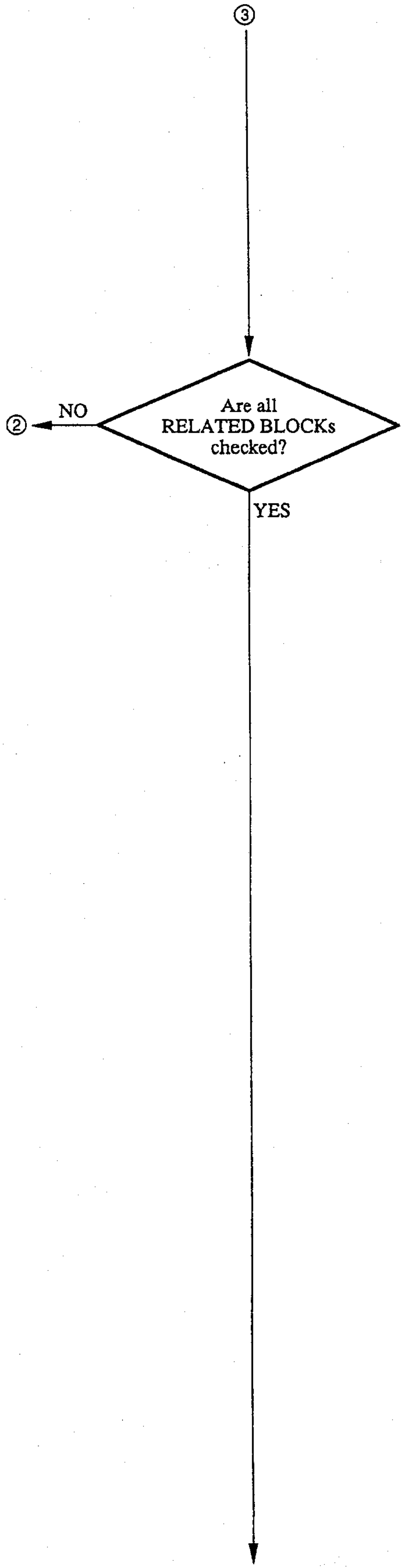


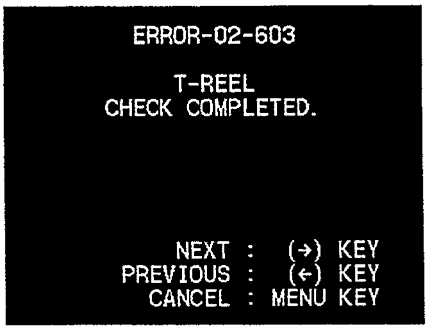
```
ERROR-02-603

     T-REEL
EXECUTE DIAG. AGAIN?



       NO :   NO KEY
      YES :  YES KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

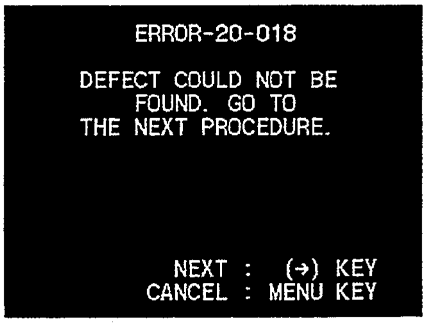


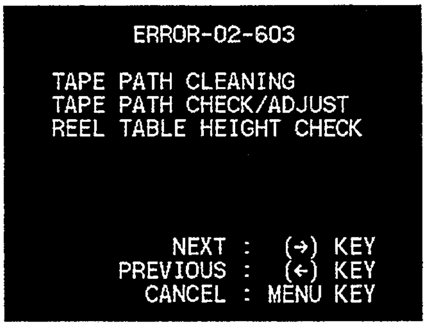
```
ERROR-02-603

    EXECUTE
< AUTO CHECK
      WITH A TAPE >?



       NO :   NO KEY
      YES :  YES KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

- Execute WITH A TAPE in SERVO CHECK or AUTO CHECK. Then, the unit checks that any error occurs or not automatically.



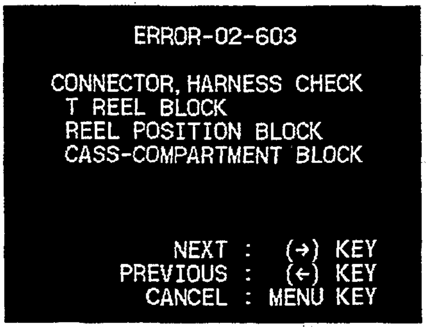

```
ERROR-02-603

   T-REEL
CHECK COMPLETED.




         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```


```
    ERROR-20-018

DEFECT COULD NOT BE
    FOUND. GO TO
THE NEXT PROCEDURE.




         NEXT :   (→) KEY
       CANCEL : MENU KEY
```


```
       ERROR-02-603

TAPE PATH CLEANING
TAPE PATH CHECK/ADJUST
REEL TABLE HEIGHT CHECK




         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```

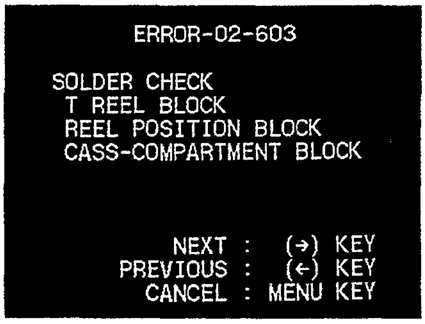
- Perform check with referring to section 7 in Service Manual Vol. 1.

Continues to the next page.



```
         ERROR-02-603

CONNECTOR, HARNESS CHECK
 T REEL BLOCK
 REEL POSITION BLOCK
 CASS-COMPARTMENT BLOCK



         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```

- Check all connectors and harnesses in relation to the blocks that are displayed with referring to block diagrams.

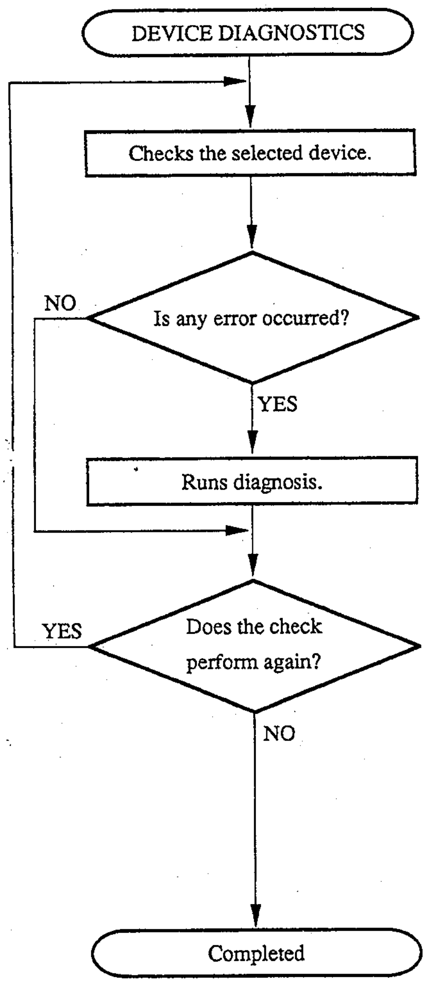


```
         ERROR-02-603

SOLDER CHECK
 T REEL BLOCK
 REEL POSITION BLOCK
 CASS-COMPARTMENT BLOCK



         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```

- Check the solders on the blocks that are displayed with referring to block diagram.

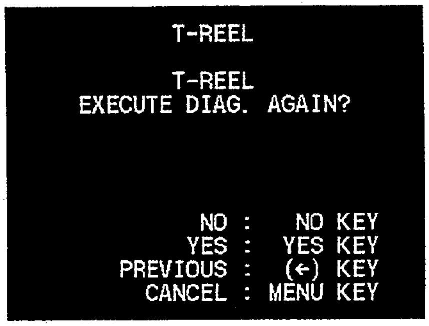
④

DEVICE DIAGNOSTICS


DEVICE DIAGNOSTICS
Checks the selected device.
NO
Is any error occurred?
YES
Runs diagnosis.
YES
Does the check perform again?
NO
Completed

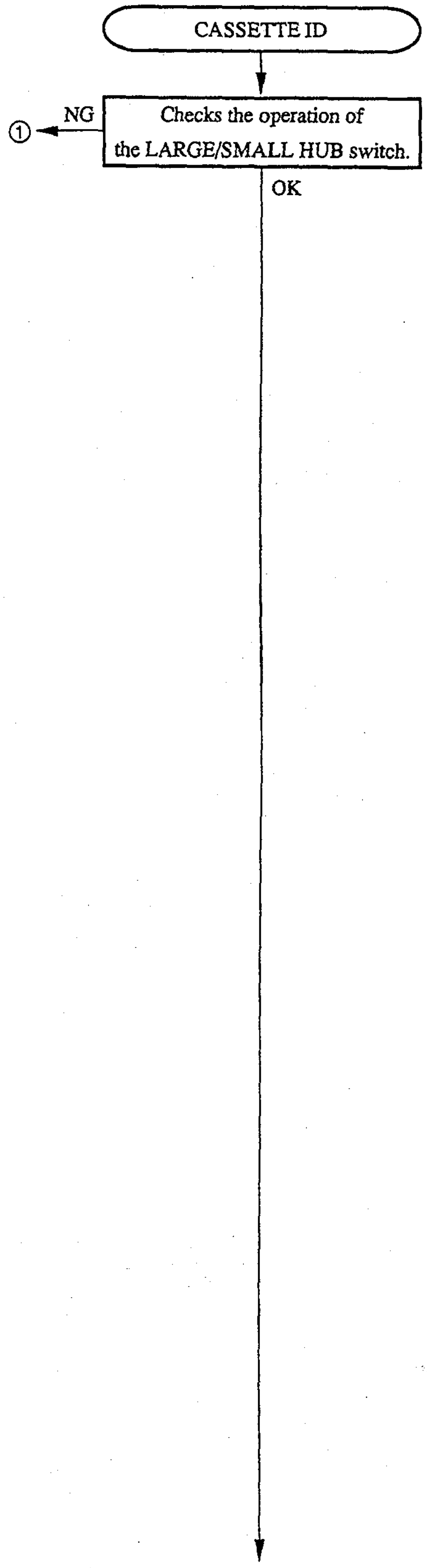
- The contents of the check are different from each device. For details, refer to the flowchart of each device.

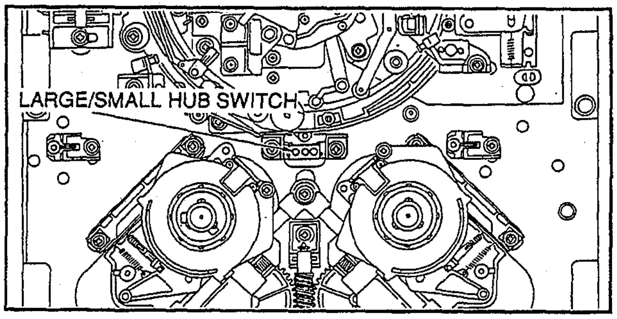
- The contents of the diagnosis are different from each device. For details, refer to the flowchart of each device.

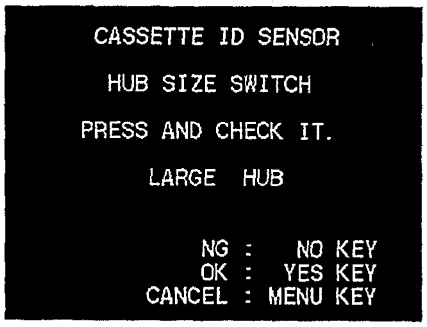


```
            T-REEL

            T-REEL
     EXECUTE DIAG. AGAIN?



               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

(1) CASSETTE ID Diagnosis


CASSETTE ID
NG
①
Checks the operation of the LARGE/SMALL HUB switch.
OK


LARGE/SMALL HUB SWITCH


CASSETTE ID SENSOR

HUB SIZE SWITCH

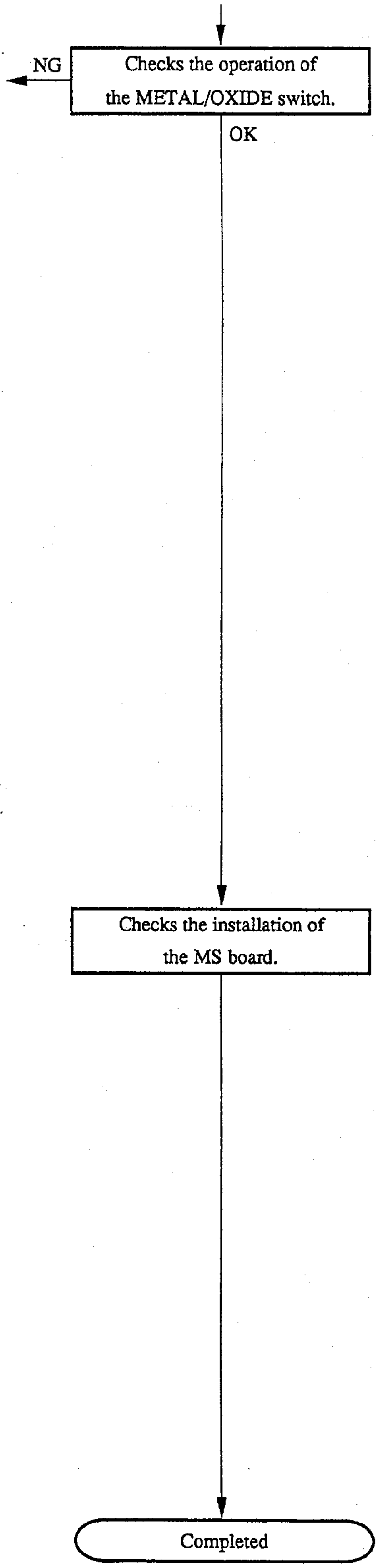
PRESS AND CHECK IT.

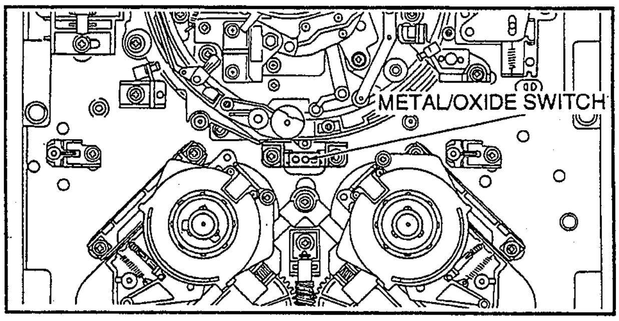
LARGE HUB

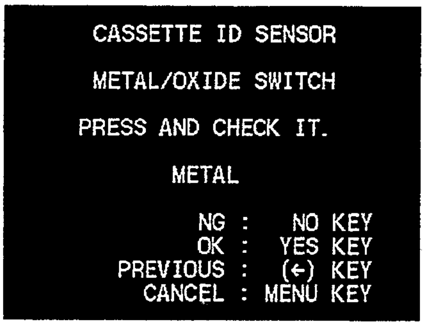
NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY

<How to decide>

	Not pressing by hand	Pressing by hand	Decision	
Display	LARGE HUB	SMALL HUB	OK	
	LARGE HUB	LARGE HUB	NG	NG ①
	SMALL HUB	SMALL HUB	NG	


NG
Checks the operation of the METAL/OXIDE switch.
OK
Checks the installation of the MS board.
Completed


METAL/OXIDE SWITCH

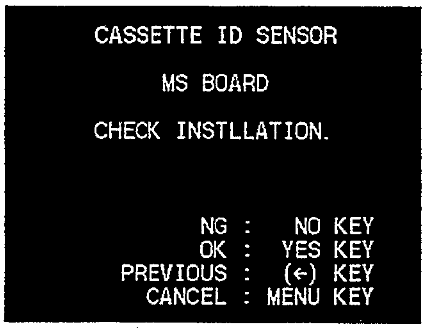


```
CASSETTE ID SENSOR
METAL/OXIDE SWITCH
PRESS AND CHECK IT.
METAL

      NG :    NO KEY
      OK :   YES KEY
PREVIOUS :   (←) KEY
  CANCEL :  MENU KEY
```

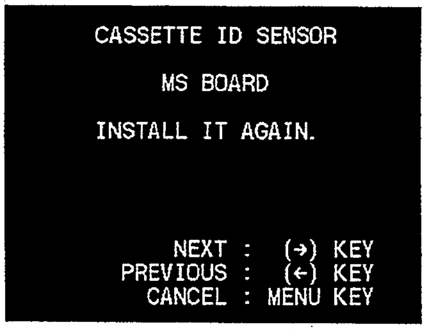
<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	METAL	OXIDE	OK
	METAL	METAL	NG
	OXIDE	OXIDE	NG

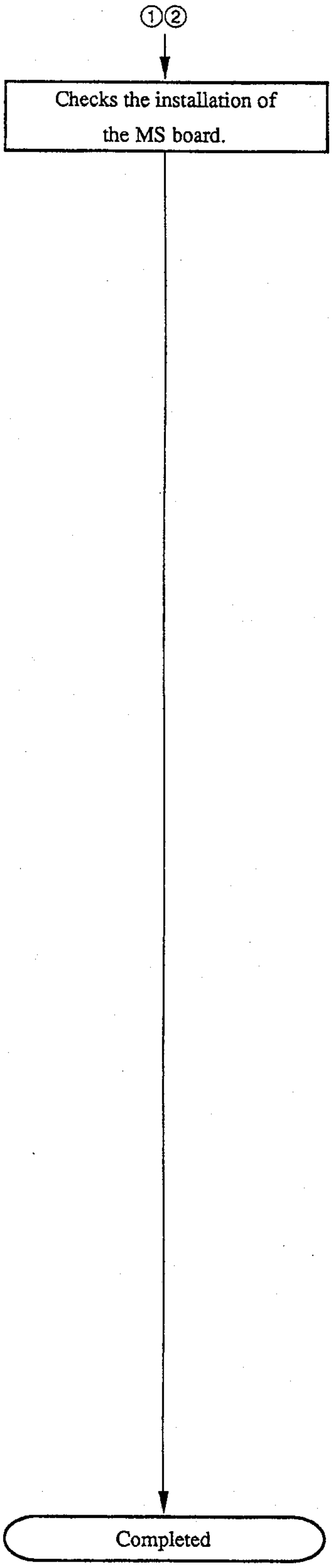
NG ②



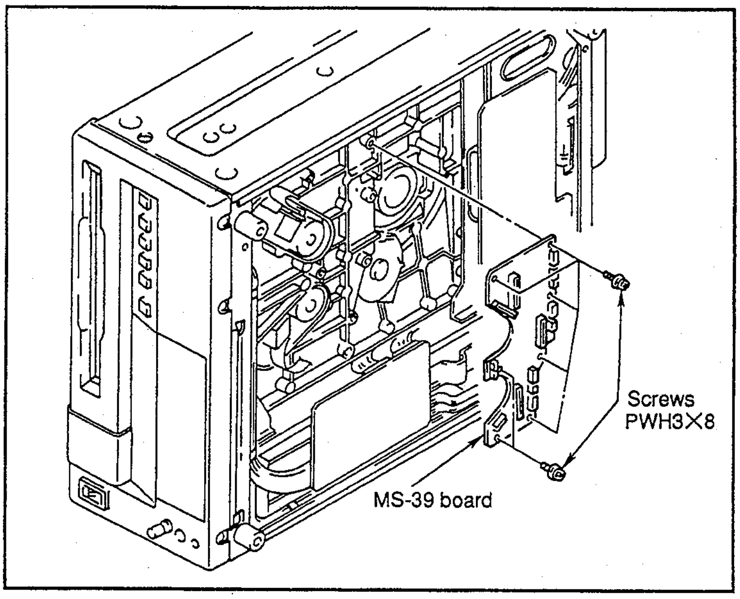
```
CASSETTE ID SENSOR
MS BOARD
CHECK INSTLLATION.


      NG :    NO KEY
      OK :   YES KEY
PREVIOUS :   (←) KEY
  CANCEL :  MENU KEY
```



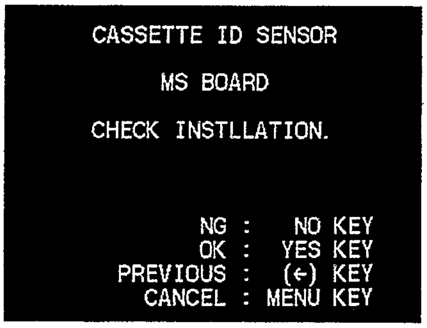
```
CASSETTE ID SENSOR
MS BOARD
INSTALL IT AGAIN.


    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL :  MENU KEY
```


①②
Checks the installation of the MS board.
Completed

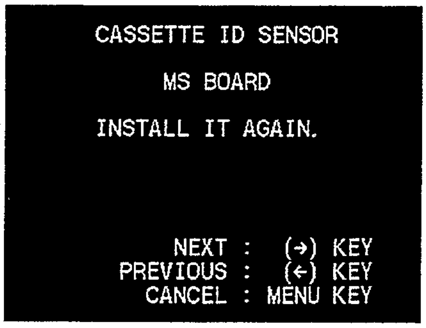
- Installation of the MS-39 board


Screws
PWH3×8
MS-39 board

Check : The all seven screws (PWH3 × 8) should be tightened.
There should not be clearance between the MS board and the mechanical parts.

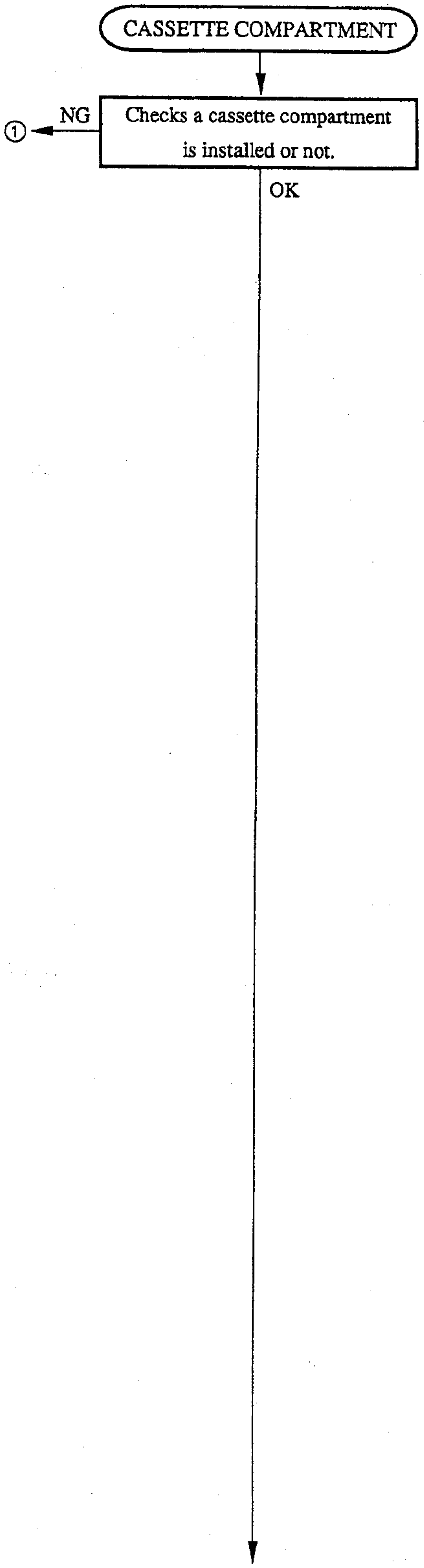


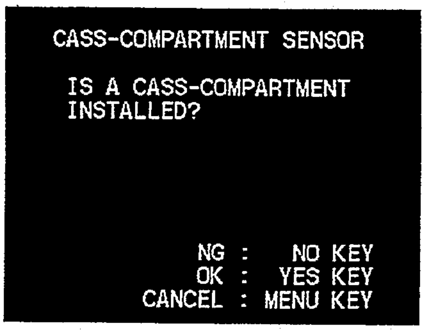
```
        CASSETTE ID SENSOR
             MS BOARD
        CHECK INSTLLATION.


                 NG :   NO KEY
                 OK :  YES KEY
           PREVIOUS :  (←) KEY
             CANCEL : MENU KEY
```



```
        CASSETTE ID SENSOR
             MS BOARD
        INSTALL IT AGAIN.


               NEXT :  (→) KEY
           PREVIOUS :  (←) KEY
             CANCEL : MENU KEY
```

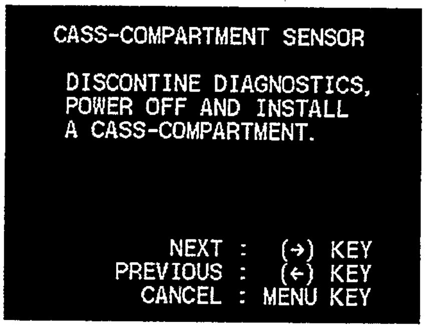
(2) CASSETTE COMPARTMENT Diagnosis





```
CASS-COMPARTMENT SENSOR

 IS A CASS-COMPARTMENT
 INSTALLED?



                 NG :   NO KEY
                 OK :  YES KEY
             CANCEL : MENU KEY
```

- Check that the cassette compartment is installed on the unit and harnesses are connected to the connectors on the cassette compartment.
- If any cassette compartment is not installed, install one. If any harness is not connected to the connectors, connect ones. Then, run the diagnosis.
- When pressing the YES (OK) switch, a cassette compartment sensor checks that a cassette compartment is installed or not. If the sensor decides that the cassette compartment is not installed, proceed to ①.



```
CASS-COMPARTMENT SENSOR

 DISCONTINE DIAGNOSTICS,
 POWER OFF AND INSTALL
 A CASS-COMPARTMENT.



               NEXT :  (→) KEY
           PREVIOUS :  (←) KEY
             CANCEL : MENU KEY
```

- Check that a cassette compartment is installed on the unit and harnesses are connected to the connectors.

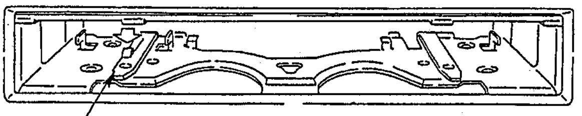
Continues to the next page.

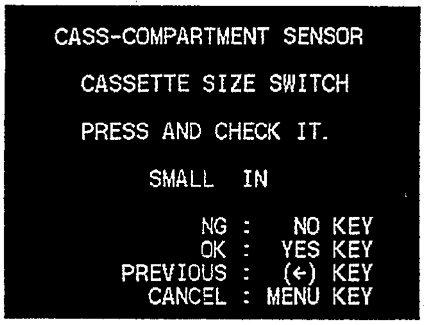
② ← NG

Checks the operation of the LARGE/SMALL switch.

OK ↓

* Lift up the cassette window by hand.





```
CASS-COMPARTMENT SENSOR
 CASSETTE SIZE SWITCH
 PRESS AND CHECK IT.
     SMALL  IN

          NG :   NO KEY
          OK :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

<How to decide>

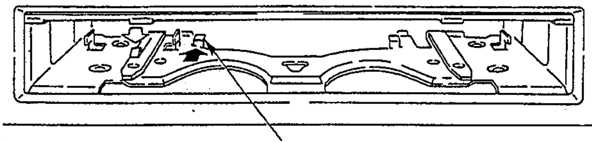
	Not pressing by hand	Pressing by hand	Decision
Display	SMALL IN	LARGE IN	OK
	SMALL IN	SMALL IN	NG
	LARGE IN	LARGE IN	NG

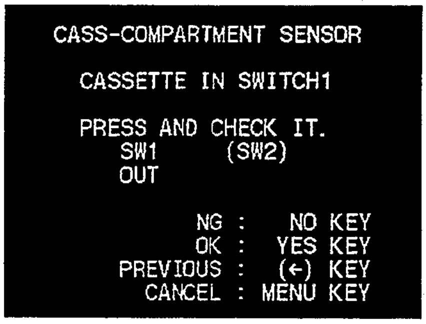
NG ②

NG ← **Checks the operation of the CASSETTE IN switch 1.**

OK

∗ Lift up the cassette window by hand.



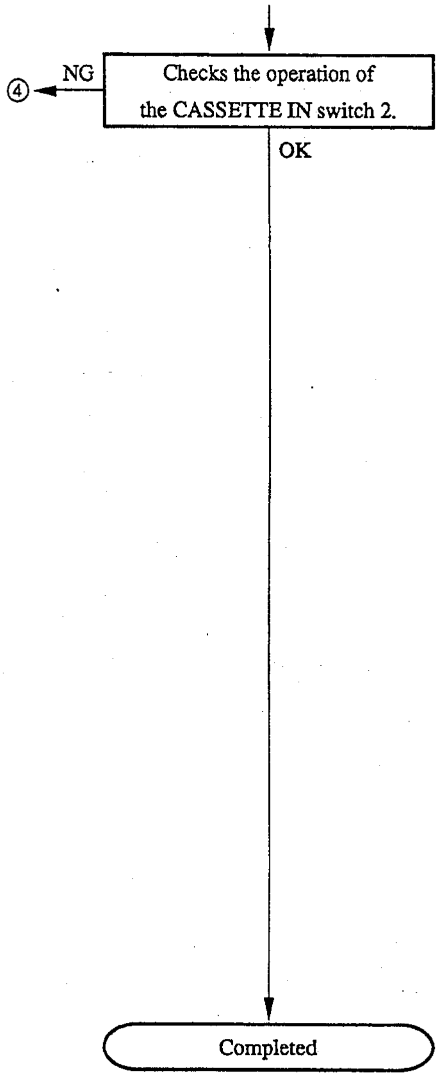


```
CASS-COMPARTMENT SENSOR

  CASSETTE IN SWITCH1

  PRESS AND CHECK IT.
     SW1      (SW2)
     OUT

            NG :   NO KEY
            OK :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

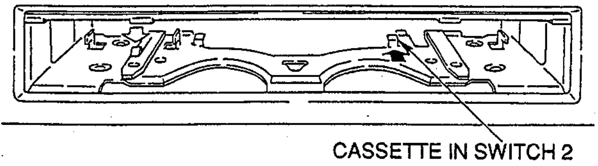
<How to decide>

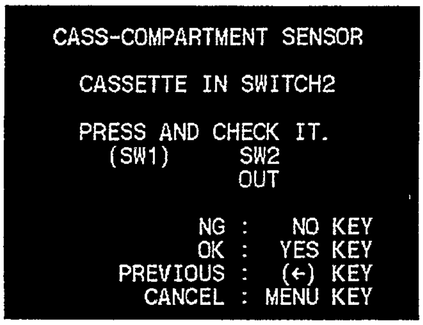
	Not pressing by hand	Pressing by hand	Decision	
Display	OUT	IN	OK	
	OUT	OUT	NG	NG ③
	IN	IN	NG	

Continues to the next page.


④
NG
Checks the operation of the CASSETTE IN switch 2.
OK
Completed

* Lift up the cassette window by hand.


CASSETTE IN SWITCH 2

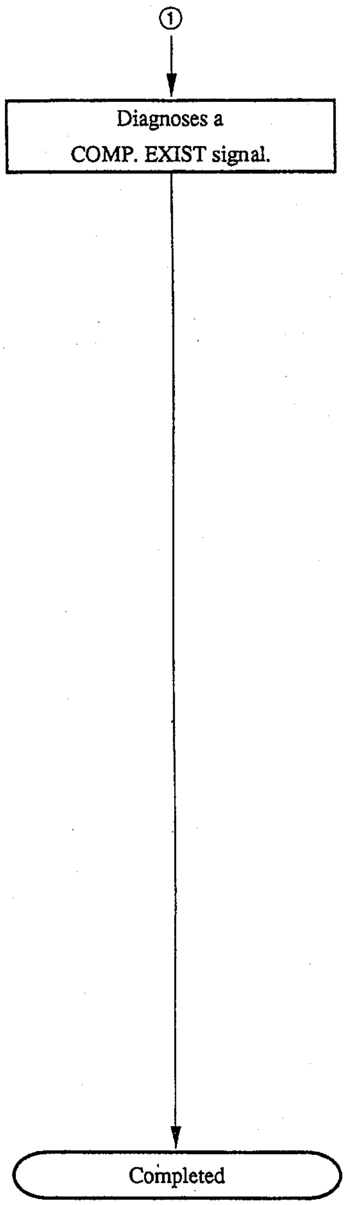


```
CASS-COMPARTMENT SENSOR

 CASSETTE IN SWITCH2

 PRESS AND CHECK IT.
   (SW1)      SW2
              OUT

               NG :    NO KEY
               OK :   YES KEY
         PREVIOUS :   (←) KEY
           CANCEL :  MENU KEY
```

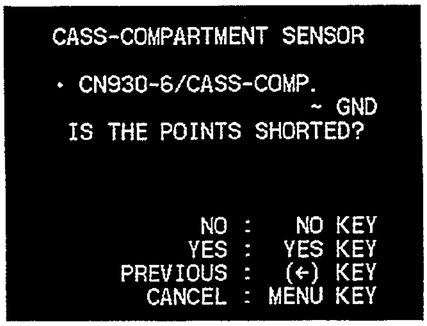
<How to decide>

	Not pressing by hand	Pressing by hand	Decision
Display	OUT	IN	OK
	OUT	OUT	NG
	IN	IN	NG

NG ④

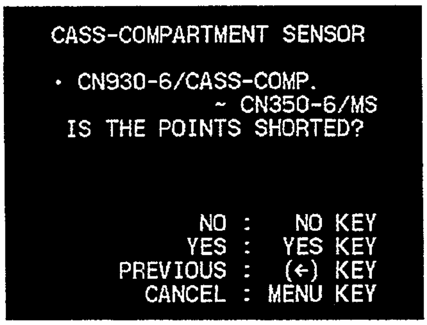


- When a cassette compartment sensor decides that a cassette compartment is not installed, in spite that the cassette compartment is surely installed.



```
CASS-COMPARTMENT SENSOR

 • CN930-6/CASS-COMP.
                    ~ GND
 IS THE POINTS SHORTED?


            NO :   NO KEY
           YES :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

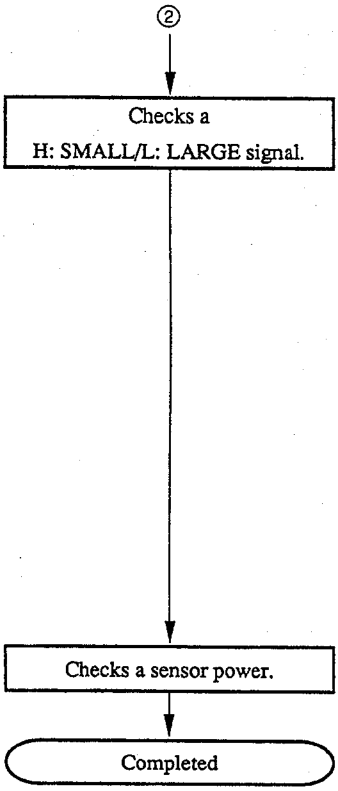
- Stop the diagnosis and turn off the power. Then, check that between pin 6 of CN930 on the CASS-COMP. and GND on the mechanical chassis is shorted by using a tester and so on.
  After checking, turn on the power and continue the diagnosis.



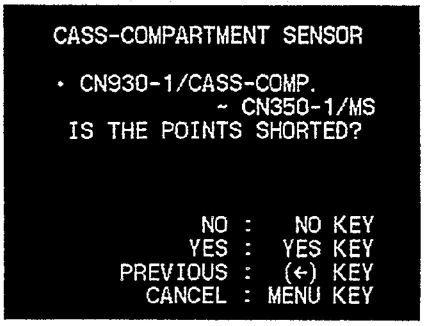
```
CASS-COMPARTMENT SENSOR

 • CN930-6/CASS-COMP.
             ~ CN350-6/MS
 IS THE POINTS SHORTED?


            NO :   NO KEY
           YES :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.
  After checking, install the DR board and turn on the power. Then, continue the diagnosis.
  Shorted : YES key
  Not shorted : No key


②
Checks a H: SMALL/L: LARGE signal.
Checks a sensor power.
Completed

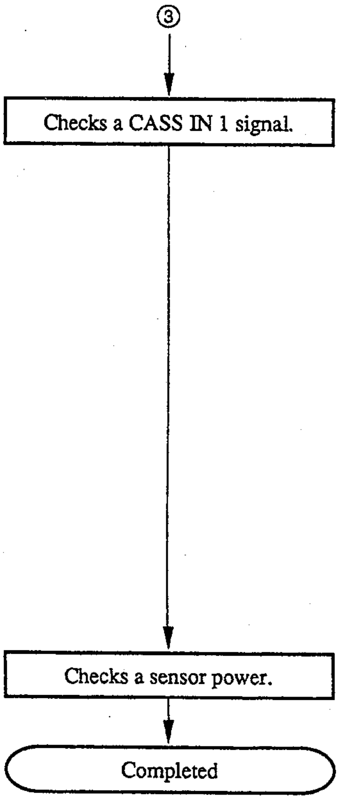
- With using both Auto (Input state of port) and Manual (Input of switch), continue the diagnosis.



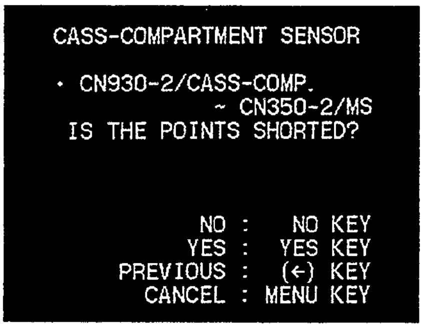
```
CASS-COMPARTMENT SENSOR

 • CN930-1/CASS-COMP.
              ~ CN350-1/MS
  IS THE POINTS SHORTED?



               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.
  After checking, install the DR board and turn on the power. Then, continue the diagnosis.


③
Checks a CASS IN 1 signal.
Checks a sensor power.
Completed

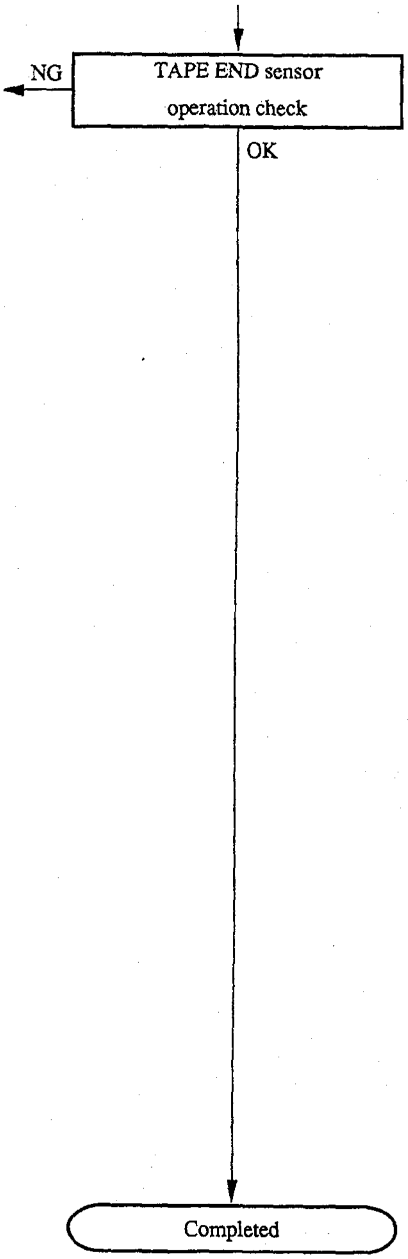
- With using both Auto (Input state of port) and Manual (Input of switch), continue the diagnosis.

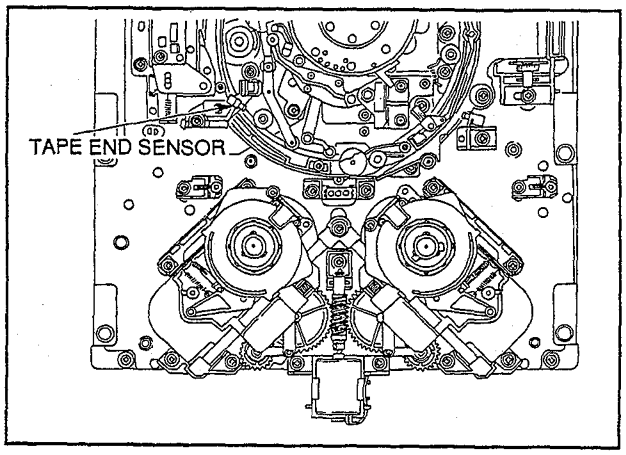


```
CASS-COMPARTMENT SENSOR

 • CN930-2/CASS-COMP.
              ~ CN350-2/MS
  IS THE POINTS SHORTED?



               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

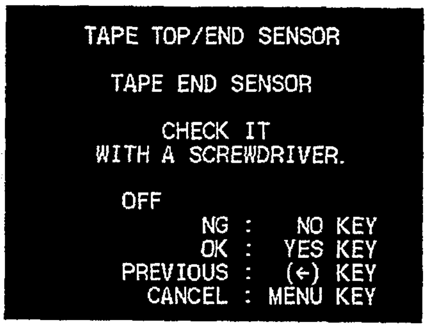
- CN350/MS-39 (L-5)

- Stop the diagnosis and turn off the power. Then, remove the DR board and check the connection by using a tester and so on.
  After checking, install the DR board and turn on the power. Then, continue the diagnosis.


NG
TAPE END sensor operation check
OK
Completed


TAPE END SENSOR

- Close a screwdriver to the TAPE END sensor.

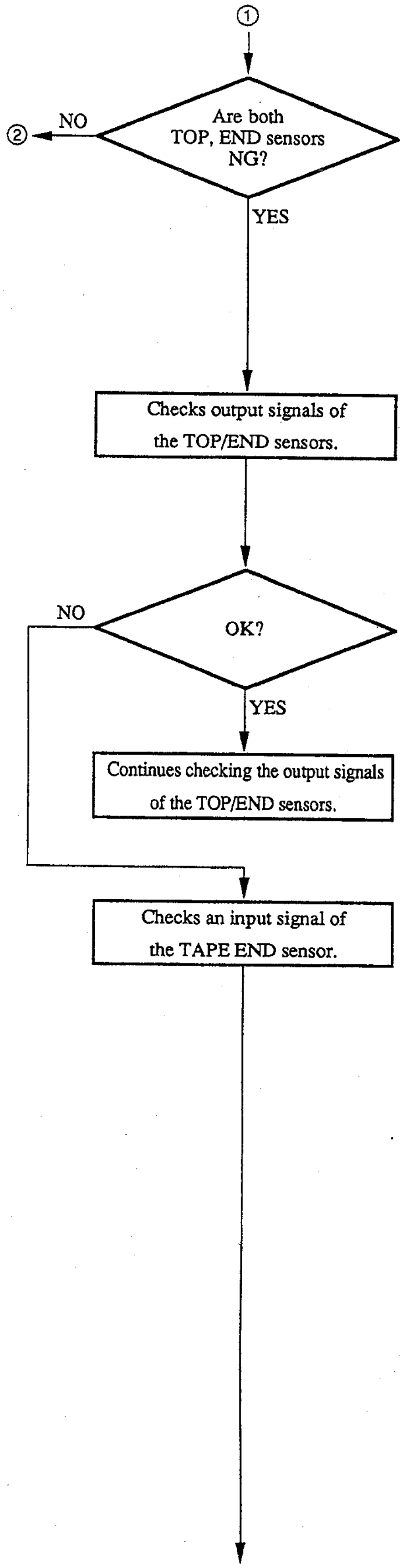


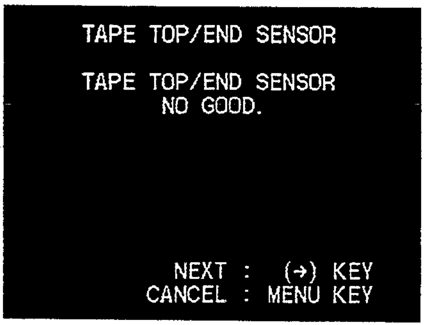
```
TAPE TOP/END SENSOR

TAPE END SENSOR

CHECK IT
WITH A SCREWDRIVER.

OFF
        NG :   NO KEY
        OK :  YES KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

<How to decide>

	Not touching a screwdriver to tape end sensor	Touching a screwdriver to tape end sensor	Decision
Display	OFF	ON	OK
	OFF	OFF	NG
	ON	ON	NG

NG ⑥

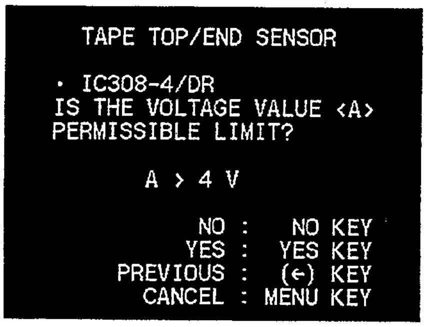

①
NO
②
Are both TOP, END sensors NG?
YES
Checks output signals of the TOP/END sensors.
NO
OK?
YES
Continues checking the output signals of the TOP/END sensors.
Checks an input signal of the TAPE END sensor.



TAPE TOP/END SENSOR

TAPE TOP/END SENSOR
NO GOOD.

NEXT : (→) KEY
CANCEL : MENU KEY



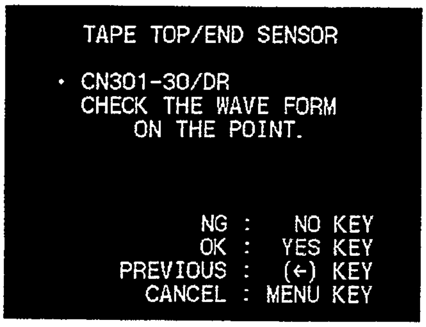
TAPE TOP/END SENSOR

• IC308-4/DR
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

A > 4 V

NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- IC308/DR-214 (E-5)

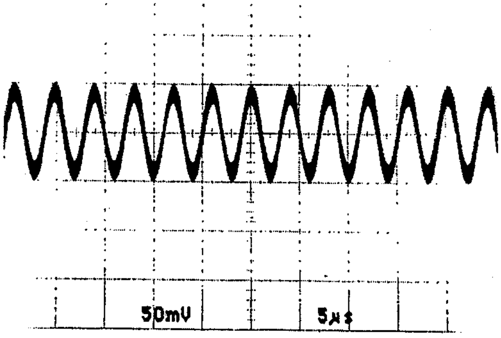


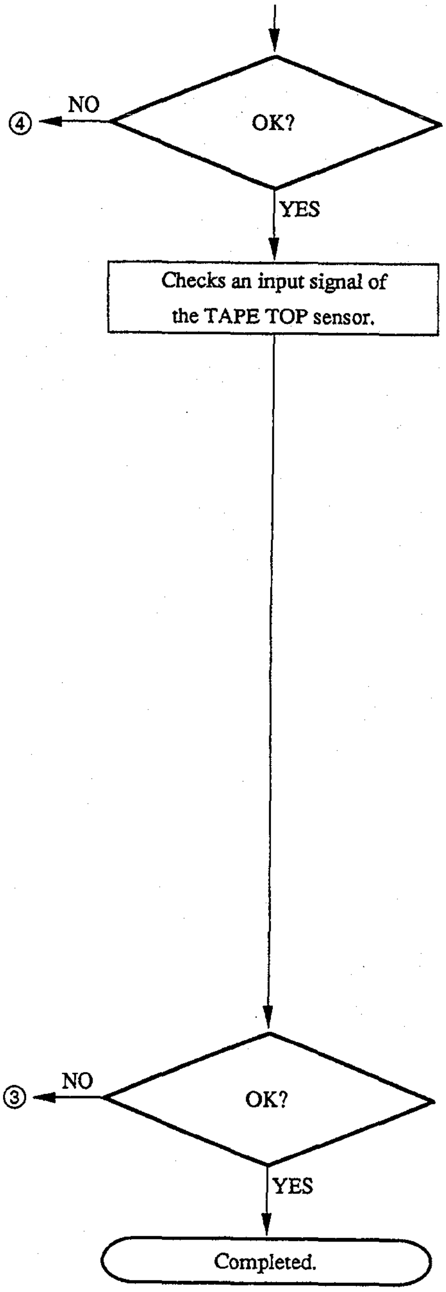
TAPE TOP/END SENSOR

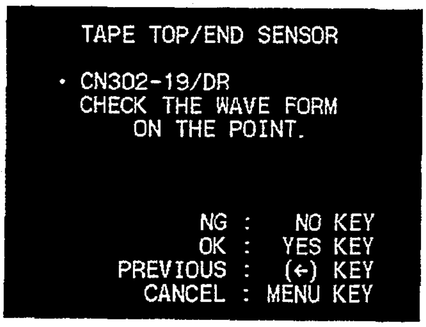
• CN301-30/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-30/DR-214 (C-5) waveform



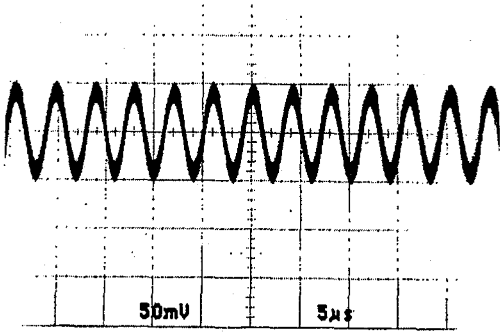

④
NO
OK?
YES
Checks an input signal of the TAPE TOP sensor.
③
NO
OK?
YES
Completed.

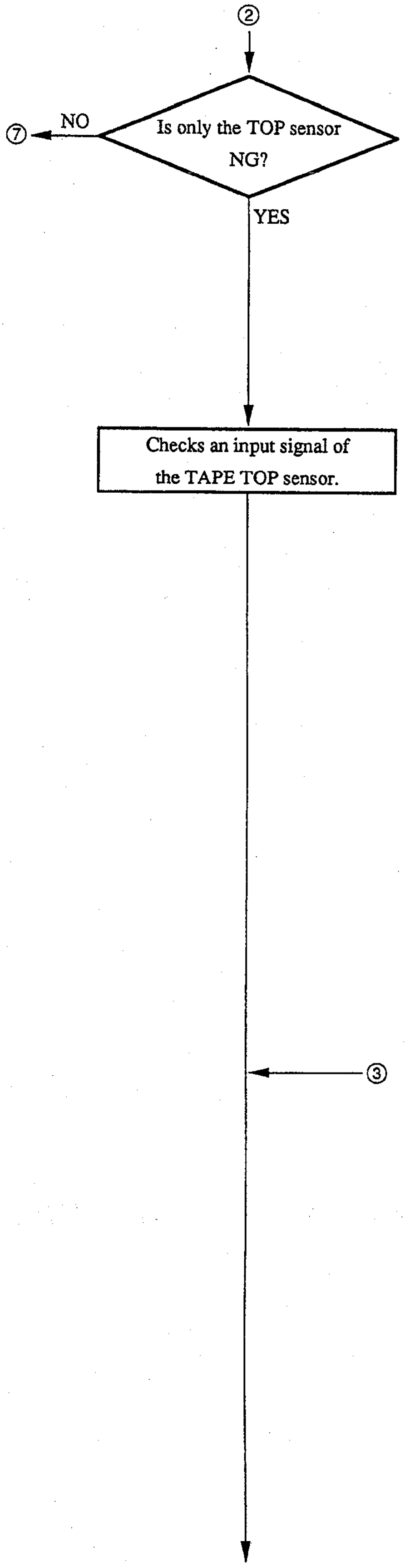

TAPE TOP/END SENSOR

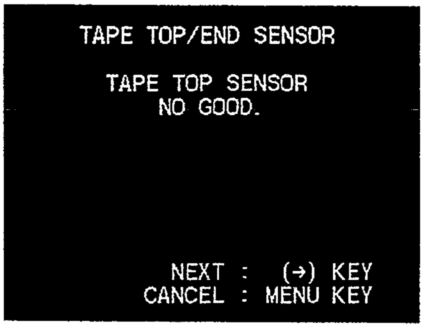
• CN302-19/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

• CN302-19/DR-214 (H-5) waveform

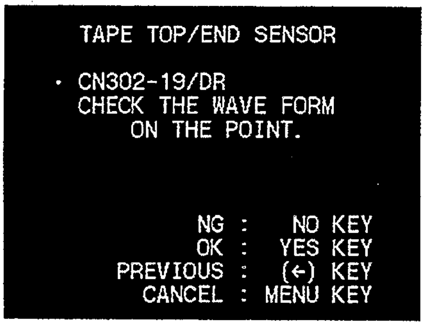



②
Is only the TOP sensor NG?
NO
⑦
YES
Checks an input signal of the TAPE TOP sensor.
③


TAPE TOP/END SENSOR

TAPE TOP SENSOR
NO GOOD.

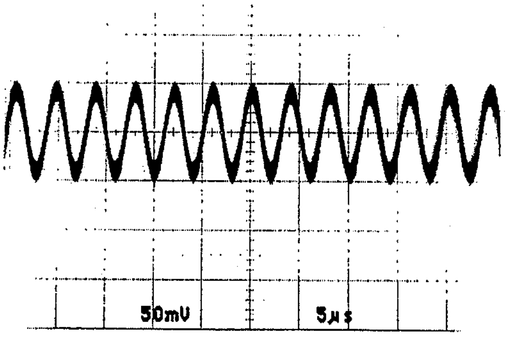
NEXT : (→) KEY
CANCEL : MENU KEY

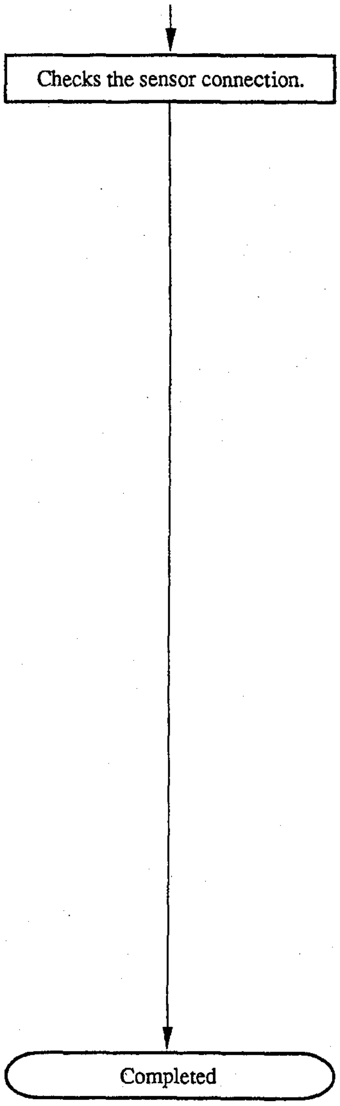

TAPE TOP/END SENSOR

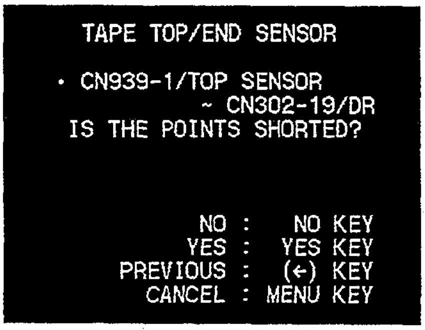
- CN302-19/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN302-19/DR-214 (H-5) waveform



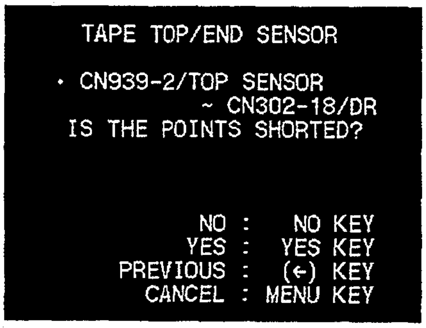




```
          TAPE TOP/END SENSOR

        • CN939-1/TOP SENSOR
                   ~ CN302-19/DR
       IS THE POINTS SHORTED?



                     NO :   NO KEY
                    YES :  YES KEY
               PREVIOUS :  (←) KEY
                 CANCEL : MENU KEY
```

- CN302/DR-214 (H-5)

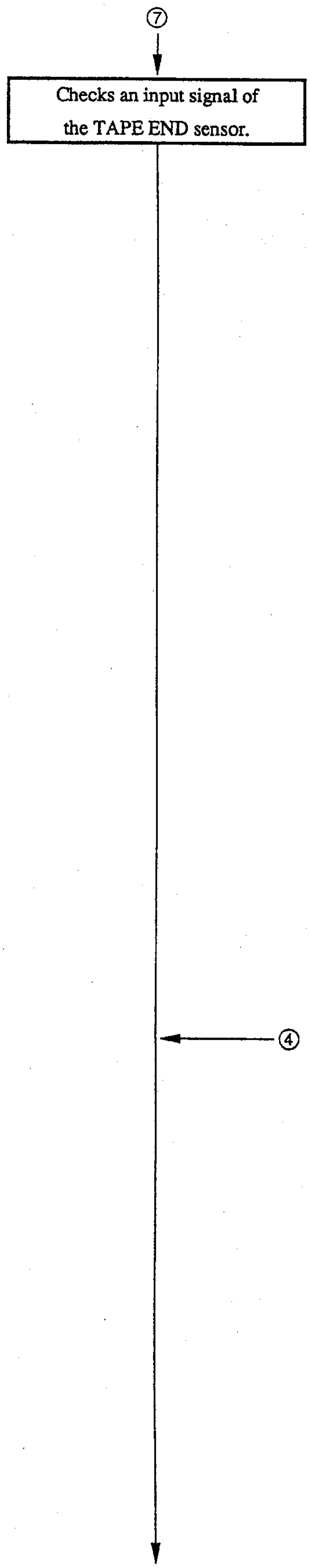
- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.

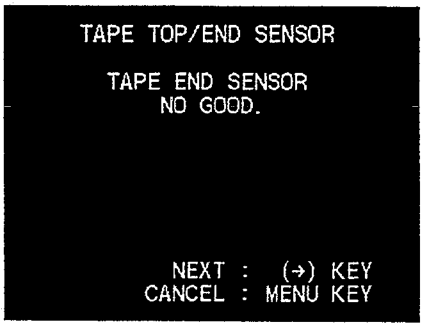


```
          TAPE TOP/END SENSOR

        • CN939-2/TOP SENSOR
                   ~ CN302-18/DR
       IS THE POINTS SHORTED?



                     NO :   NO KEY
                    YES :  YES KEY
               PREVIOUS :  (←) KEY
                 CANCEL : MENU KEY
```

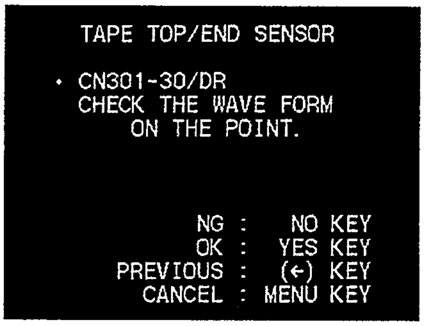
- CN302/DR-214 (H-5)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.


⑦
Checks an input signal of the TAPE END sensor.
④

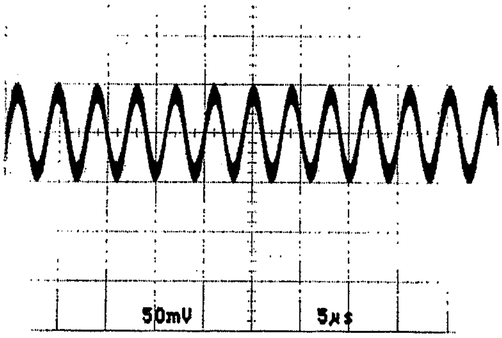


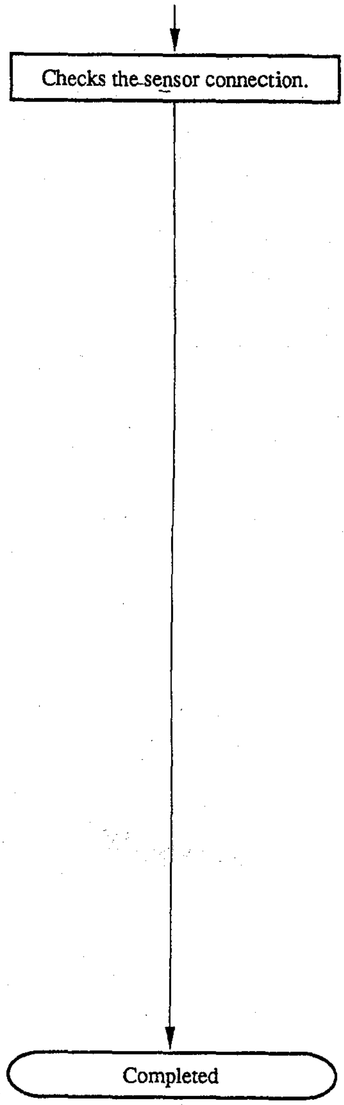
```
TAPE TOP/END SENSOR

   TAPE END SENSOR
      NO GOOD.




        NEXT :   (→) KEY
      CANCEL : MENU KEY
```

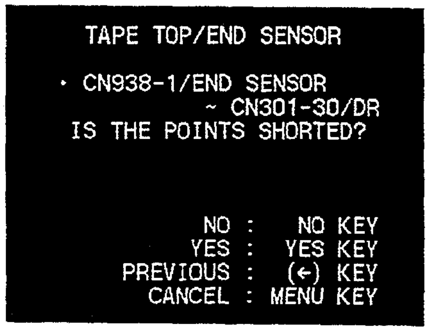


```
TAPE TOP/END SENSOR

• CN301-30/DR
  CHECK THE WAVE FORM
      ON THE POINT.


          NG :   NO KEY
          OK :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

• CN301-30/DR-214 (C-5) waveform



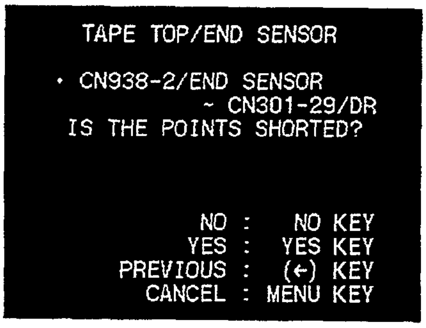




```
     TAPE TOP/END SENSOR

 • CN938-1/END SENSOR
            ~ CN301-30/DR
IS THE POINTS SHORTED?



              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- CN301/DR-214 (C-5)

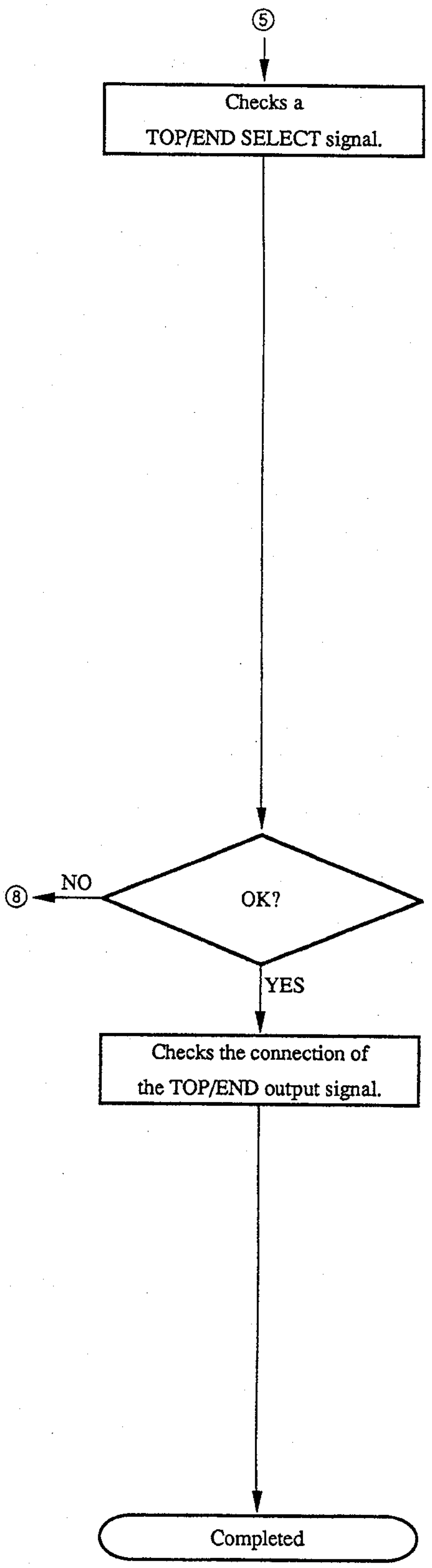
- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.

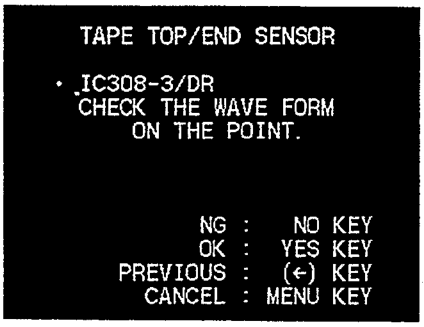


```
     TAPE TOP/END SENSOR

 • CN938-2/END SENSOR
            ~ CN301-29/DR
IS THE POINTS SHORTED?



              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- CN301/DR-214 (C-5)

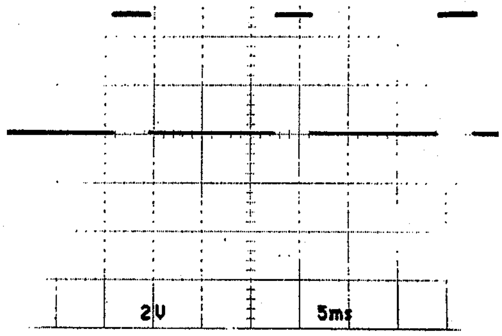
- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.

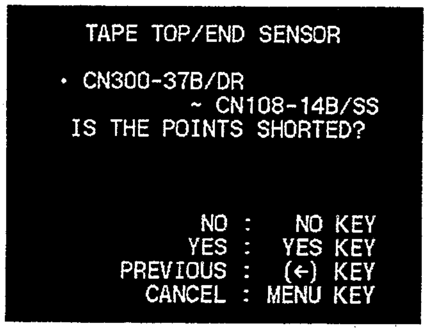

⑤
Checks a TOP/END SELECT signal.
OK?
NO
⑧
YES
Checks the connection of the TOP/END output signal.
Completed



```
TAPE TOP/END SENSOR

 • IC308-3/DR
   CHECK THE WAVE FORM
       ON THE POINT.


              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

• IC308-3/DR-214 (E-5) waveform

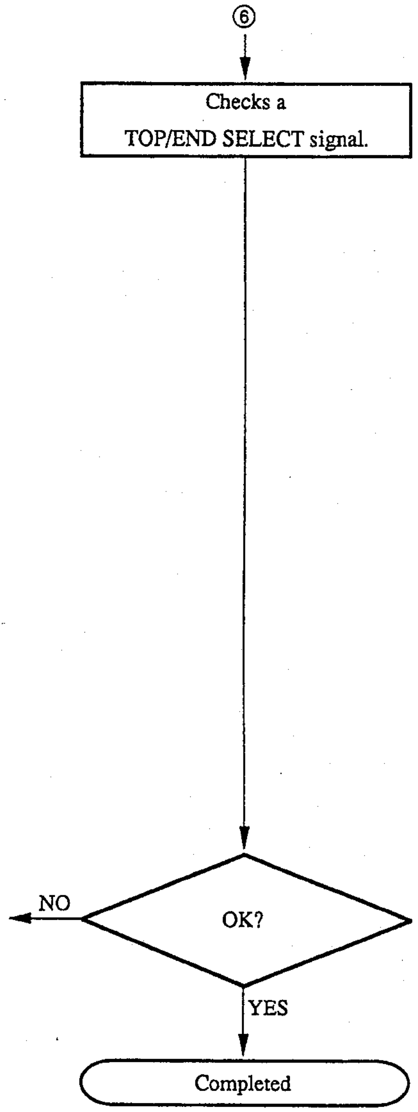


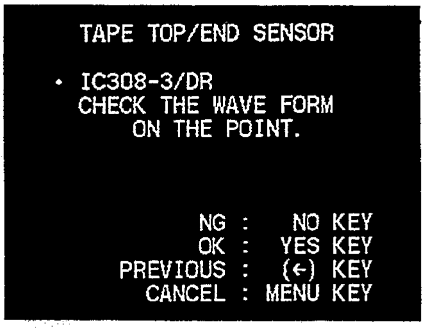


```
TAPE TOP/END SENSOR

 • CN300-37B/DR
           ~ CN108-14B/SS
 IS THE POINTS SHORTED?


              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- CN300/DR-214 (H-1)
- CN108/SS-61 (K-6)

- Turn off the power. Then, check the connection using by a tester and so on. After checking, turn on the power and continue the diagnosis.

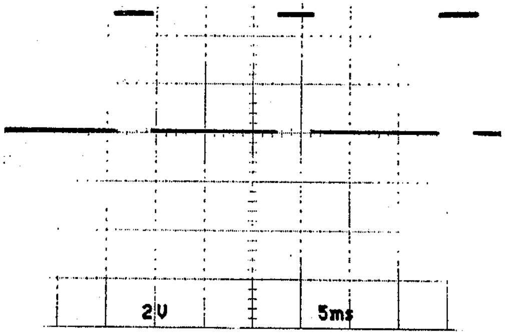

⑥
Checks a TOP/END SELECT signal.
NO
OK?
YES
Completed


TAPE TOP/END SENSOR

- IC308-3/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

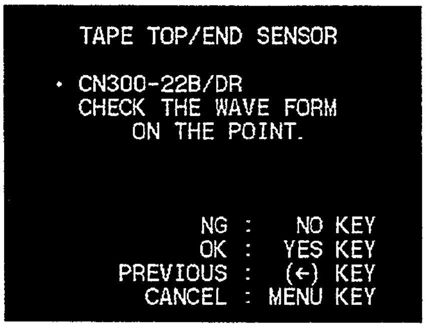
- IC308-3/DR-214 (E-5) waveform



⑧⑨

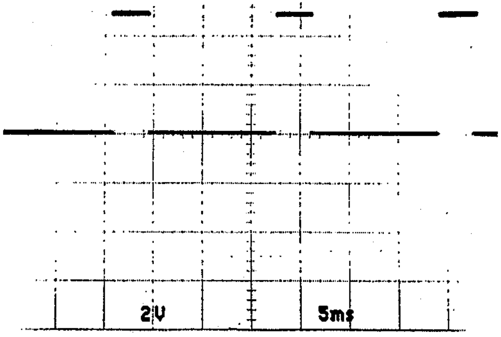
Continues checking of the TOP/END SELECT signal.

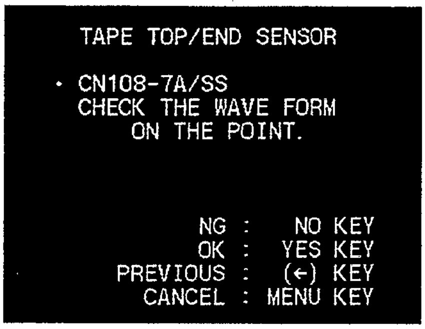
Completed



```
TAPE TOP/END SENSOR

 · CN300-22B/DR
   CHECK THE WAVE FORM
      ON THE POINT.


              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

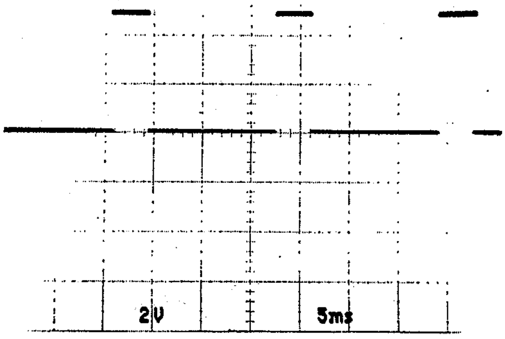
• CN300-22B/DR-214 (H-1) waveform



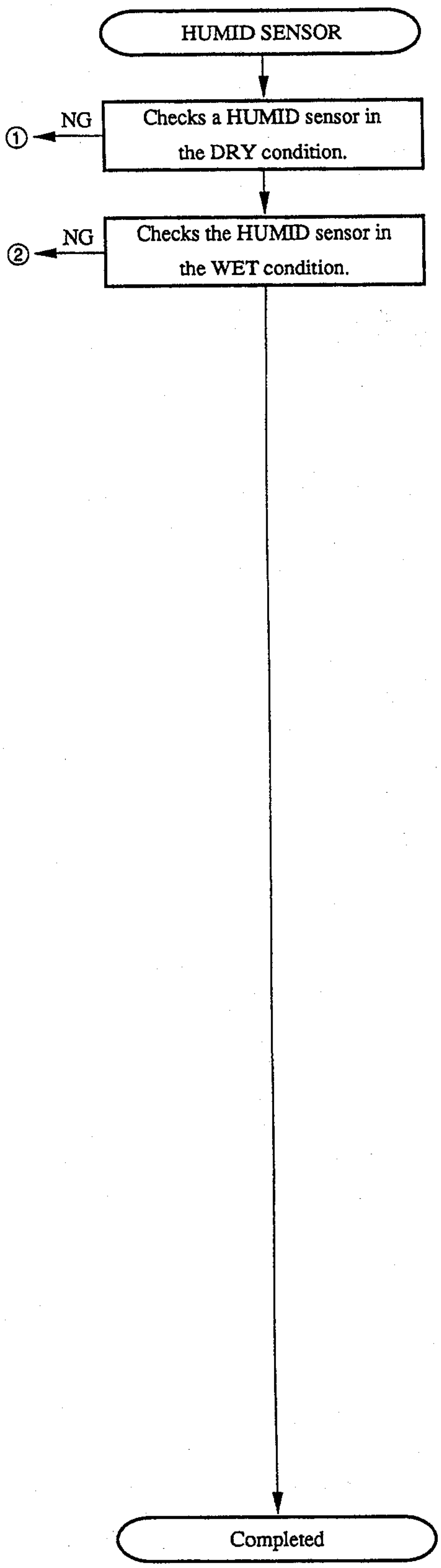


```
TAPE TOP/END SENSOR

 · CN108-7A/SS
   CHECK THE WAVE FORM
      ON THE POINT.


              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

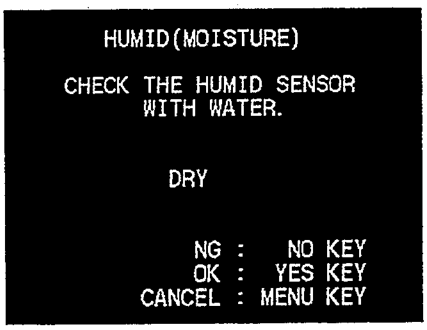
• CN108-7A/SS-61 (K-6) waveform



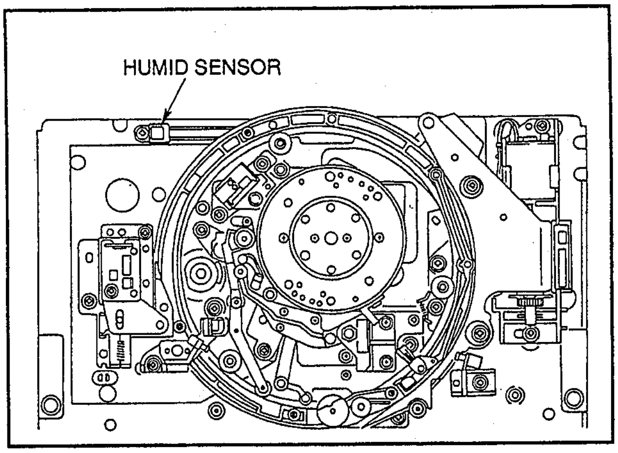
(4) HUMID Diagnosis


HUMID SENSOR
NG
①
Checks a HUMID sensor in the DRY condition.
NG
②
Checks the HUMID sensor in the WET condition.
Completed

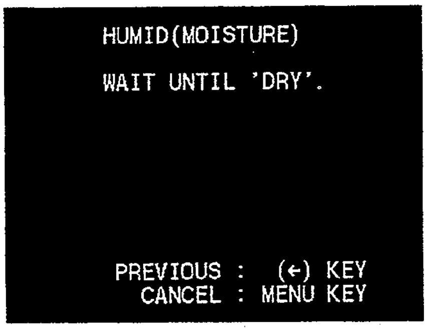
- The unit checks automatically.



```
HUMID(MOISTURE)

CHECK THE HUMID SENSOR
     WITH WATER.


        DRY


          NG :   NO KEY
          OK :  YES KEY
      CANCEL : MENU KEY
```

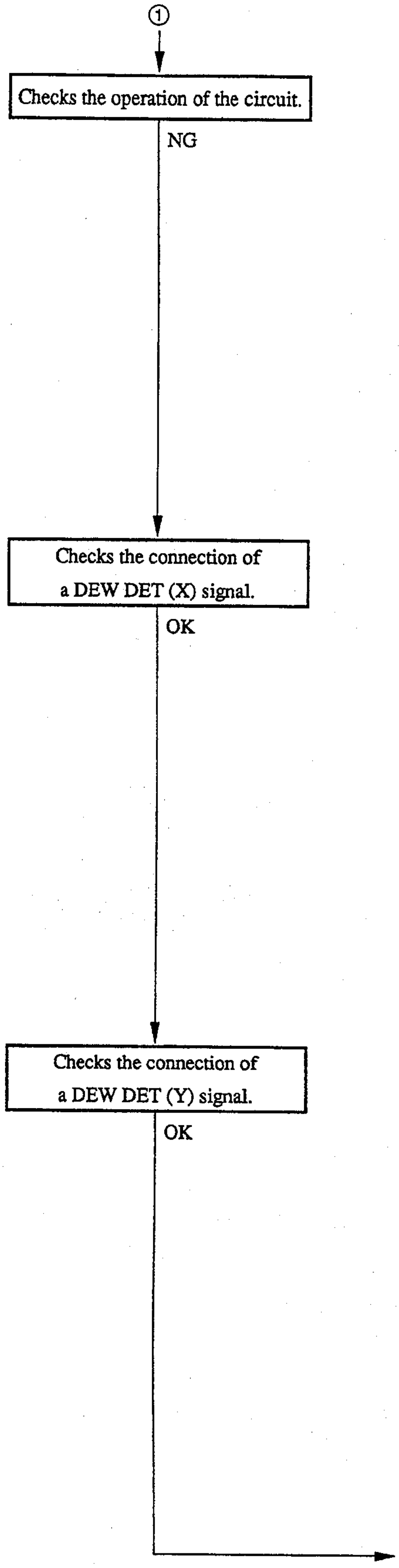

HUMID SENSOR

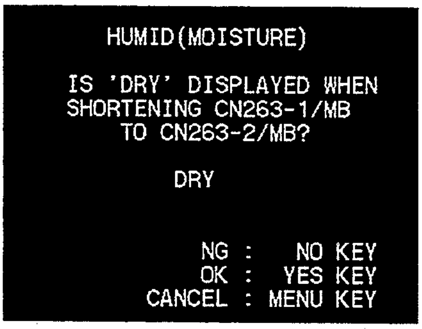
Note : Be sure to use water.
It takes a little to be responded.



```
HUMID(MOISTURE)

WAIT UNTIL 'DRY'.





 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

- After moistening the SENSOR with water, it takes a lot of time to be dry. In the case that the above is displayed, wait until the sensor becomes dry and the display changes to DRY, or turn off the power and dry the SENSOR.

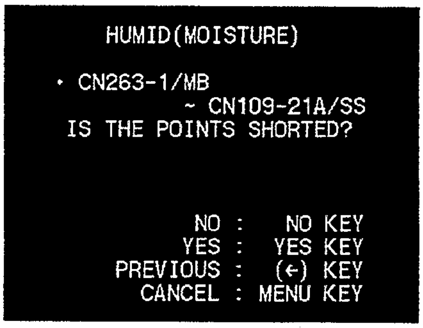

①
Checks the operation of the circuit.
NG
Checks the connection of a DEW DET (X) signal.
OK
Checks the connection of a DEW DET (Y) signal.
OK



```
      HUMID(MOISTURE)

 IS 'DRY' DISPLAYED WHEN
 SHORTENING CN263-1/MB
     TO CN263-2/MB?

          DRY


              NG :   NO KEY
              OK :  YES KEY
          CANCEL : MENU KEY
```

- CN263/MB-471 (A-3)

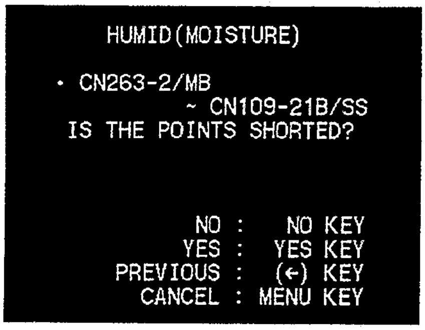
- When the above two pins are shorted, this unit is designed so that the circuit becomes DRY.



```
      HUMID(MOISTURE)

 • CN263-1/MB
           ~ CN109-21A/SS
 IS THE POINTS SHORTED?



             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- CN263/MB-471 (A-3)
  CN109/SS-61 (C-6)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.

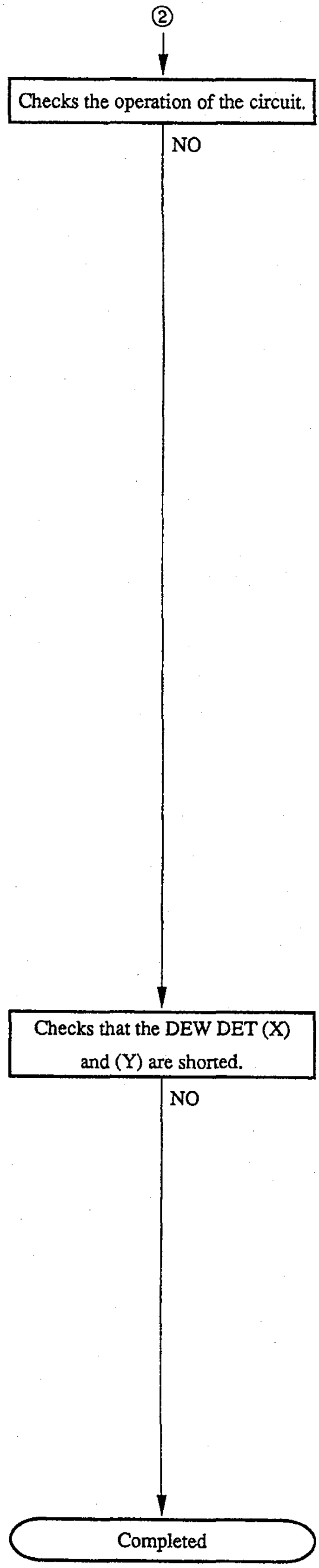


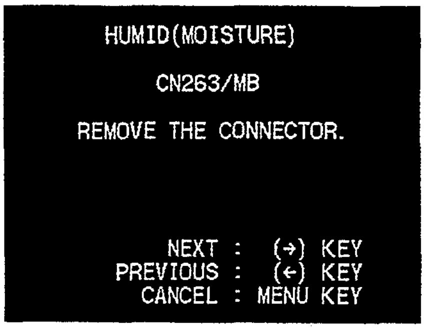
```
      HUMID(MOISTURE)

 • CN263-2/MB
           ~ CN109-21B/SS
 IS THE POINTS SHORTED?



             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- CN263/MB-471 (A-3)
  CN109/SS-61 (C-6)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, turn on the power and continue the diagnosis.

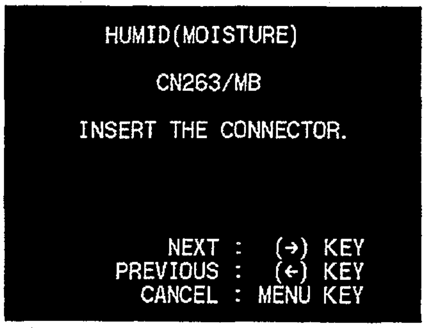
- The probable cause is that a DEW COMPARATOR on the SS board is defective.


②
Checks the operation of the circuit.
NO
Checks that the DEW DET (X) and (Y) are shorted.
NO
Completed


```
HUMID(MOISTURE)

CN263/MB

REMOVE THE CONNECTOR.

      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

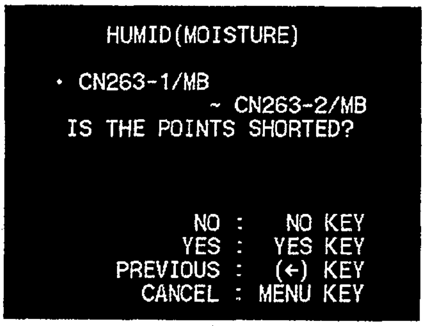
- CN263/MB-471 (A-3)

- Disconnect a harness from the connector on the MB board.
  After disconnecting, press the (→) key.


```
HUMID(MOISTURE)

CN263/MB

INSERT THE CONNECTOR.

      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

- CN263/MB-471 (A-3)

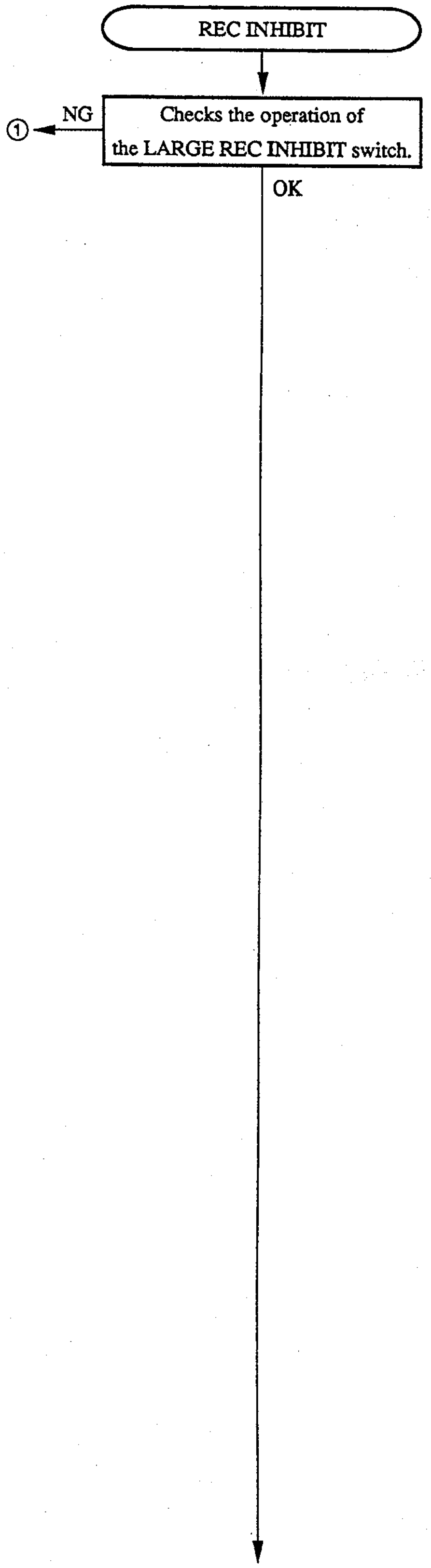
- Connect the disconnected harness to its original position.
  After connecting, press the (→) key.

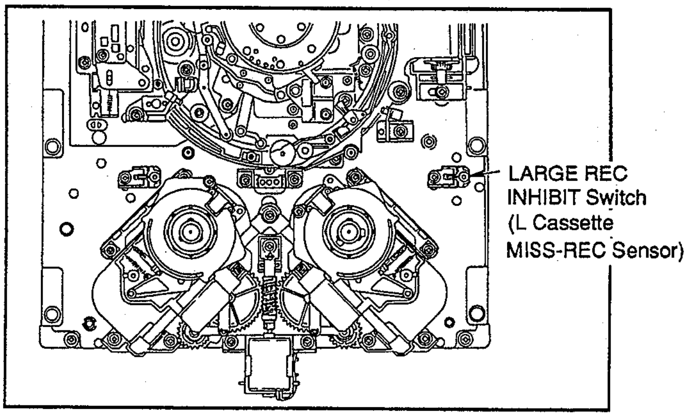

```
HUMID(MOISTURE)
 • CN263-1/MB
            ~ CN263-2/MB
IS THE POINTS SHORTED?

        NO :   NO KEY
       YES :  YES KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

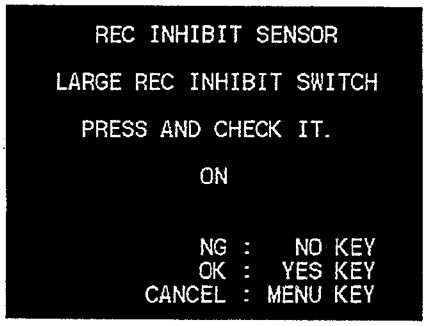
- CN263/MB-471 (A-3)

- Stop the diagnosis and turn off the power. Then, check the connection using by a tester and so on.
  After checking, connect the connector CN263 to the MB board and turn on the power. Then, continue the diagnosis.

(5) REC INHIBIT Diagnosis


REC INHIBIT
①
NG
Checks the operation of the LARGE REC INHIBIT switch.
OK


LARGE REC INHIBIT Switch (L Cassette MISS-REC Sensor)



```
REC INHIBIT SENSOR
LARGE REC INHIBIT SWITCH
PRESS AND CHECK IT.
ON

    NG :   NO KEY
    OK :  YES KEY
CANCEL : MENU KEY
```

<How to decide>

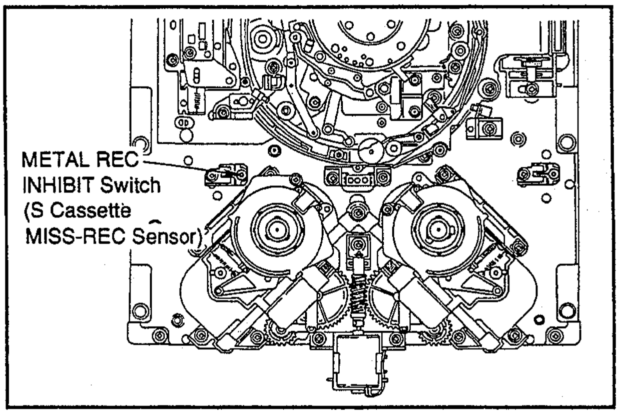
	Not pressing by hand	Pressing by hand	Decision
Display	ON	OFF	OK
	ON	ON	NG
	OFF	OFF	NG

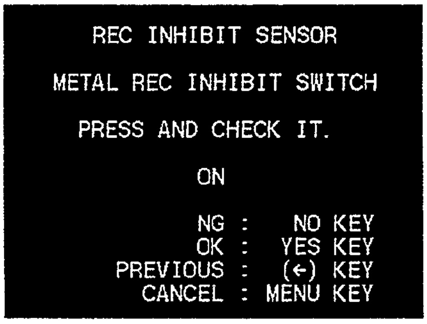
NG ①

② ← NG

Checks the operation of the METAL REC INHIBIT switch.

OK


METAL REC INHIBIT Switch
(S Cassette MISS-REC Sensor)



```
REC INHIBIT SENSOR
METAL REC INHIBIT SWITCH
PRESS AND CHECK IT.
ON
           NG :   NO KEY
           OK :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

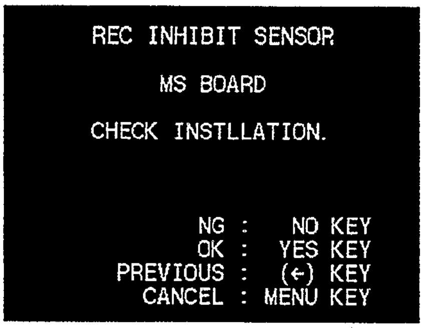
<How to decide>

	Not pressing by hand	**Pressing by hand**	**Decision**
Display	ON	OFF	OK
	ON	ON	NG
	OFF	OFF	NG

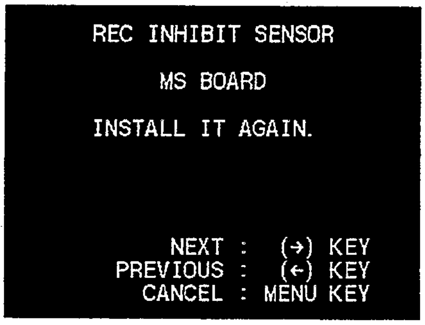
NG ②

Continues to the next page.

Checks the installation of the MS board.

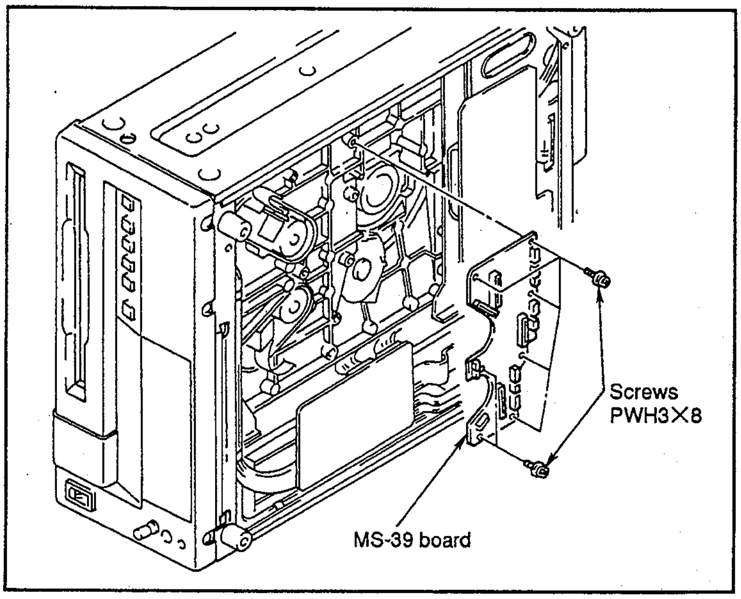


```
REC INHIBIT SENSOR

     MS BOARD

CHECK INSTLLATION.



            NG :   NO KEY
            OK :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```



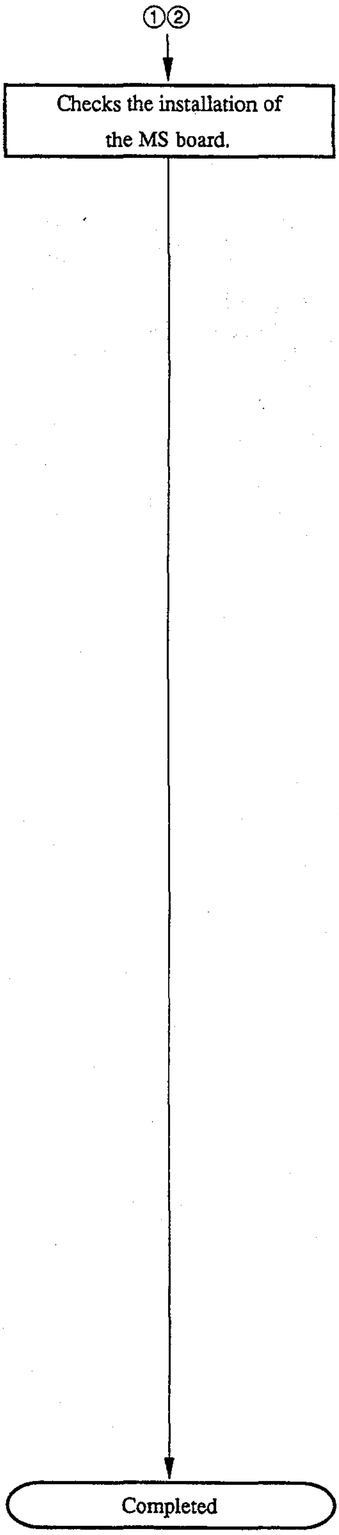
```
REC INHIBIT SENSOR

     MS BOARD

INSTALL IT AGAIN.



          NEXT :  (→) KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

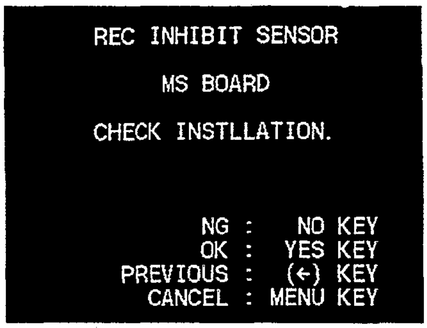
- Installation of the MS-39 board



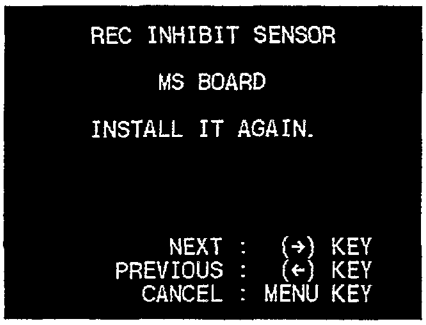
Check : The all seven screws (PWH3 × 28) should be tightened.
There should not be clearance between the MS board and the mechanical parts.

Completed

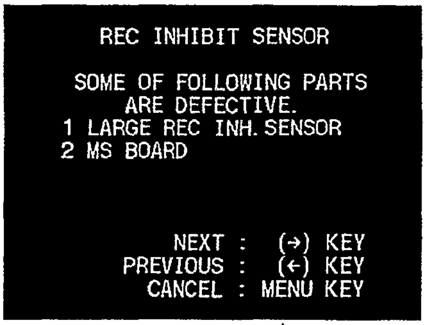

①②
Checks the installation of the MS board.
Completed



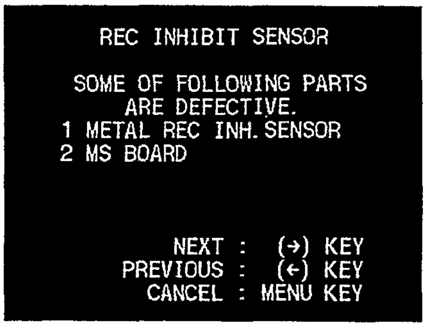
```
REC INHIBIT SENSOR

MS BOARD

CHECK INSTLLATION.


            NG :   NO KEY
            OK :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```



```
REC INHIBIT SENSOR

MS BOARD

INSTALL IT AGAIN.


          NEXT :  (→) KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

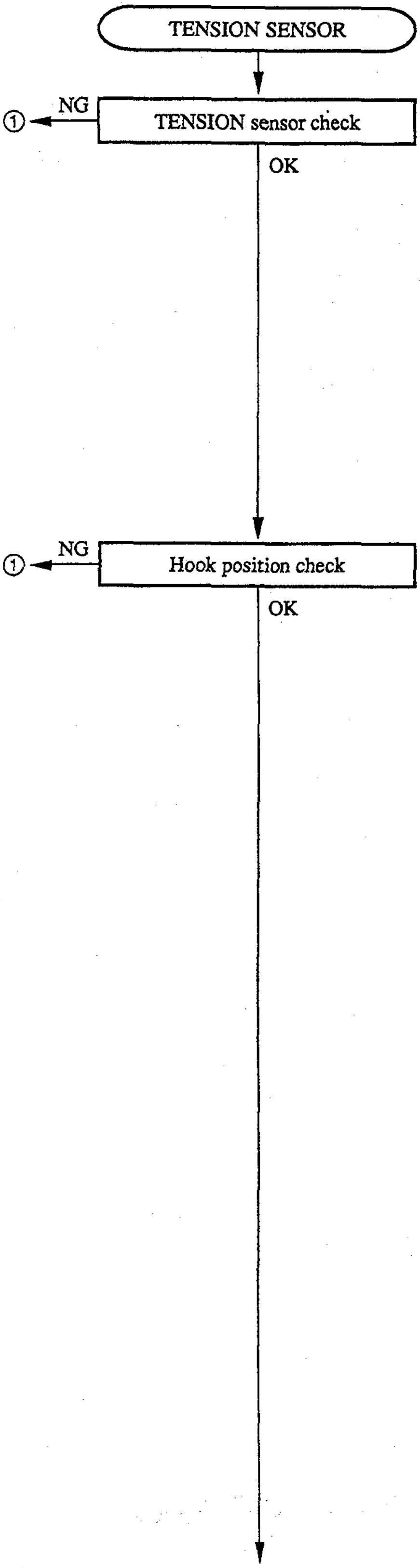


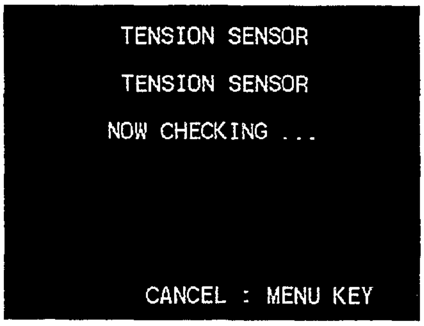
```
REC INHIBIT SENSOR

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 LARGE REC INH.SENSOR
2 MS BOARD


          NEXT :  (→) KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```



```
REC INHIBIT SENSOR

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 METAL REC INH.SENSOR
2 MS BOARD


          NEXT :  (→) KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

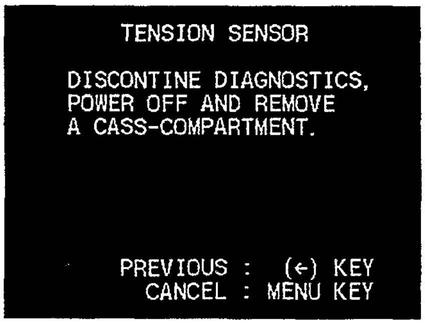
(6) TENSION SENSOR Diagnosis


TENSION SENSOR
NG
①
TENSION sensor check
OK
NG
①
Hook position check
OK



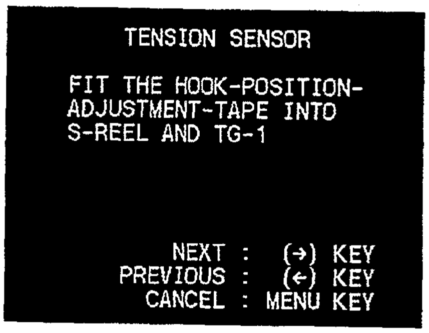
```
TENSION SENSOR
TENSION SENSOR
NOW CHECKING ...

CANCEL : MENU KEY
```

- Threading is automatically performed. Check that the output of a tension sensor is changed.

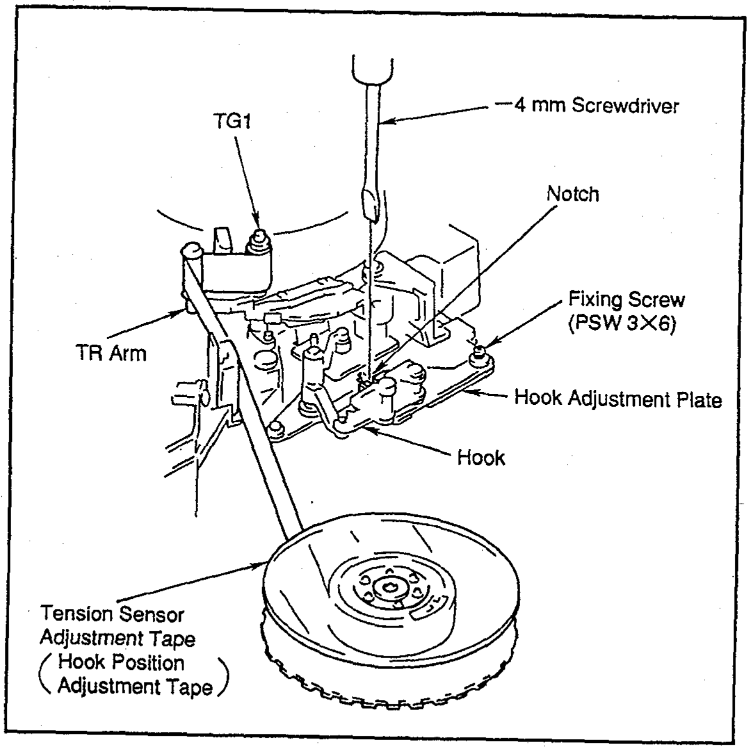


```
TENSION SENSOR
DISCONTINE DIAGNOSTICS,
POWER OFF AND REMOVE
A CASS-COMPARTMENT.

PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

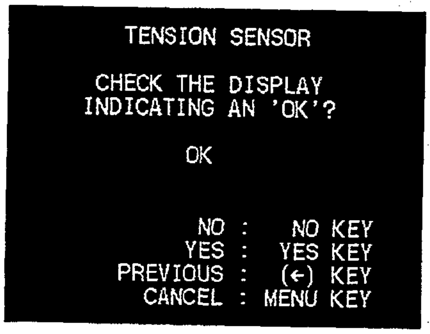
- Stop the diagnosis and turn off the power. Then, remove a cassette compartment. After removing, turn on the power and continue the diagnosis.



```
TENSION SENSOR

FIT THE HOOK-POSITION-
ADJUSTMENT-TAPE INTO
S-REEL AND TG-1



    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL : MENU KEY
```


TG1
—4 mm Screwdriver
Notch
Fixing Screw (PSW 3X6)
TR Arm
Hook Adjustment Plate
Hook
Tension Sensor Adjustment Tape (Hook Position Adjustment Tape)

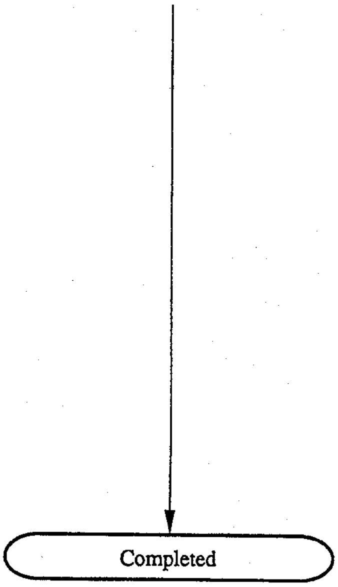
- Put the reel of the tension sensor adjustment tape on the S reel table. Then, hook the loop of the tape-top on the TG-1.
  Place the tape in the tape path condition as shown in the figure.

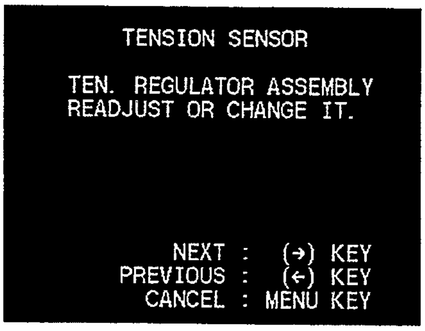


```
TENSION SENSOR

CHECK THE DISPLAY
INDICATING AN 'OK'?

OK

      NO :   NO KEY
     YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

- Check the the display is OK.

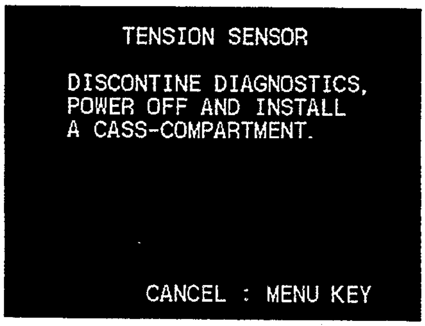
Continues to the next page.





```
TENSION SENSOR

TEN. REGULATOR ASSEMBLY
READJUST OR CHANGE IT.



      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

- In case of re-adjustment, refer to section 6-38-1 and 6-38-2 in Service Manual Vol. 1.
  In case of replacement, refer to section 6-36 in Service Manual Vol. 1.
  After adjustment, be sure to save the data in the non-volatile RAM.



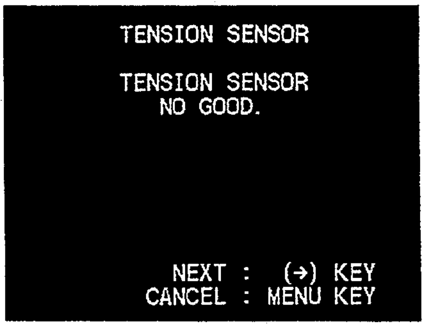
```
TENSION SENSOR

DISCONTINE DIAGNOSTICS,
POWER OFF AND INSTALL
A CASS-COMPARTMENT.



    CANCEL : MENU KEY
```

- Stop the diagnosis and turn off the power. Then, install the cassette compartment.

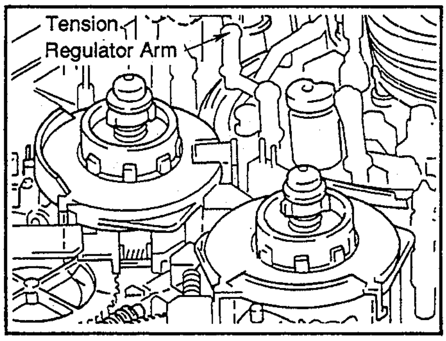
①

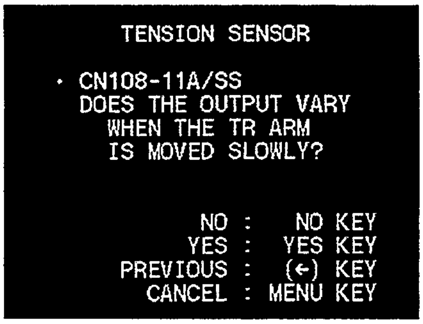
Checks an output signal of the S TENSION AMP.

NG



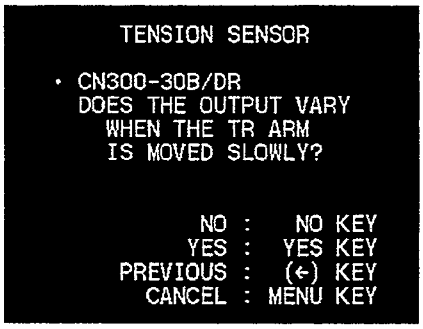
```
     TENSION SENSOR

     TENSION SENSOR
        NO GOOD.




           NEXT :   (→) KEY
         CANCEL : MENU KEY
```





```
      TENSION SENSOR

  • CN108-11A/SS
    DOES THE OUTPUT VARY
      WHEN THE TR ARM
      IS MOVED SLOWLY?

               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

- CN108/SS-61 (K-6)



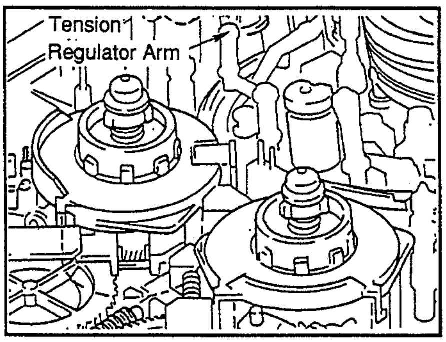
```
      TENSION SENSOR

  • CN300-30B/DR
    DOES THE OUTPUT VARY
      WHEN THE TR ARM
      IS MOVED SLOWLY?

               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

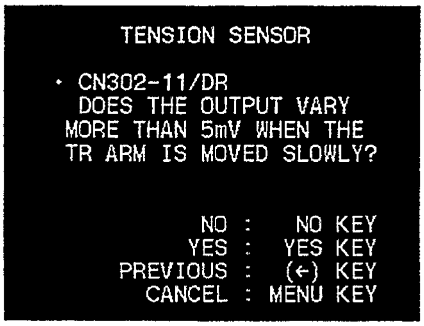
- CN300/DR-214 (H-1)

- Using an oscilloscope and so on, check the voltage at the displayed point is changed by moving the tension regulator arm lightly.
  At this time, be careful not to damage the tension regulator arm.

Continues to the next page.

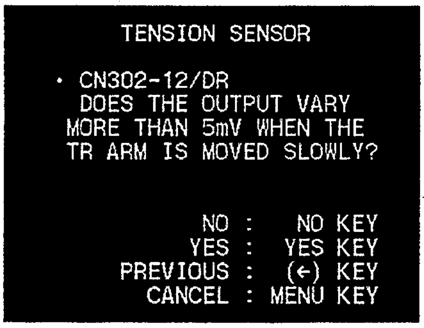
Checks an input signal of the S TENSION.





```
TENSION SENSOR

 • CN302-11/DR
   DOES THE OUTPUT VARY
  MORE THAN 5mV WHEN THE
  TR ARM IS MOVED SLOWLY?


           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- CN302/DR-214 (H-5)



```
TENSION SENSOR

 • CN302-12/DR
   DOES THE OUTPUT VARY
  MORE THAN 5mV WHEN THE
  TR ARM IS MOVED SLOWLY?


           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

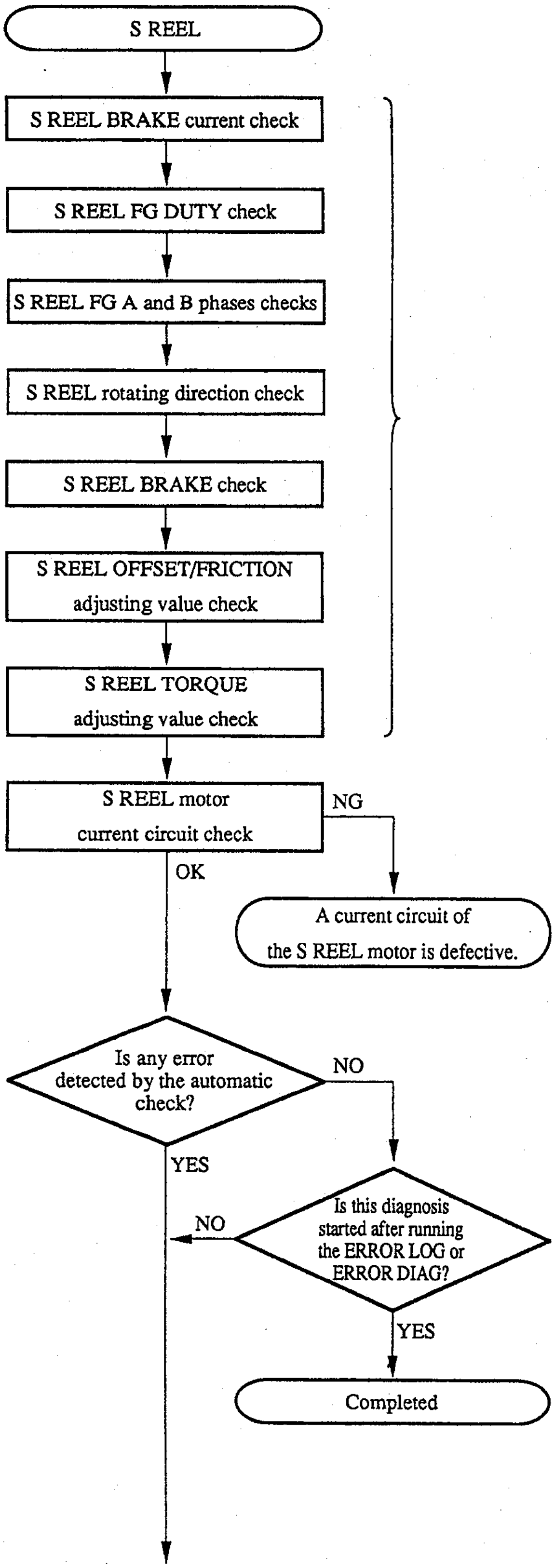
- CN302/DR-214 (H-5)

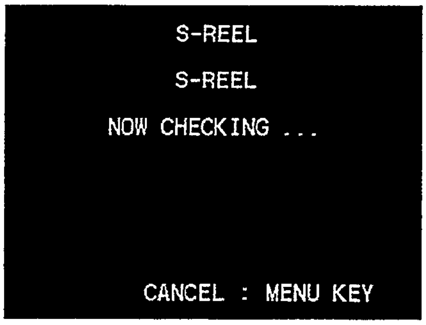
- Using an oscilloscope and so on, check the voltage at the displayed point is changed by moving the tension regulator arm lightly.
  At this time, be careful not to damage the tension regulator arm.

Checks a ADJUST +5 V signal.

Completed

(7) S REEL Diagnosis


S REEL
S REEL BRAKE current check
S REEL FG DUTY check
S REEL FG A and B phases checks
S REEL rotating direction check
S REEL BRAKE check
S REEL OFFSET/FRICTION adjusting value check
S REEL TORQUE adjusting value check
S REEL motor current circuit check
NG
OK
A current circuit of the S REEL motor is defective.
Is any error detected by the automatic check?
NO
YES
Is this diagnosis started after running the ERROR LOG or ERROR DIAG?
NO
YES
Completed

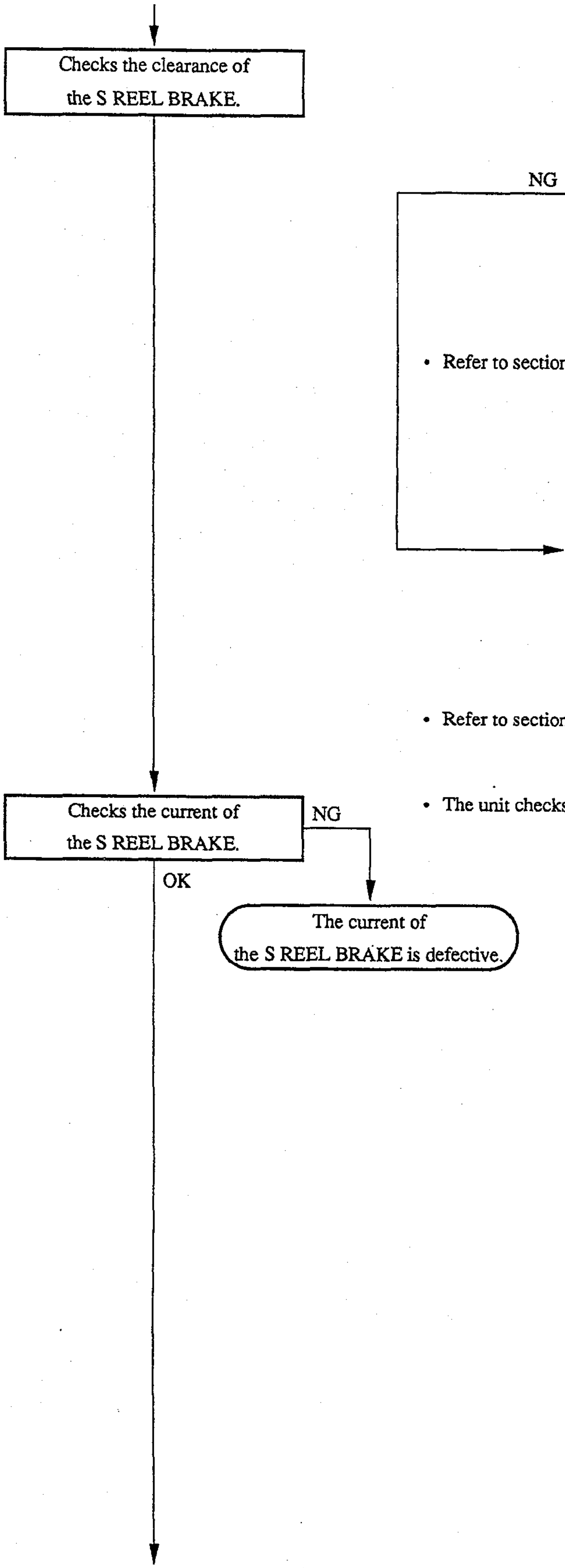


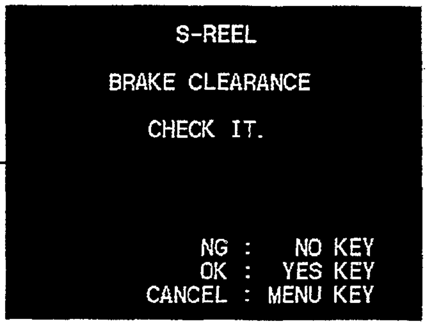
```
S-REEL
S-REEL
NOW CHECKING ...

CANCEL : MENU KEY
```

- The unit checks automatically.

- If the automatic check is completed at this step, after running the ERROR LOG or ERROR DIAG, the check is completed. Then, the diagnosis is proceeded to the next step.

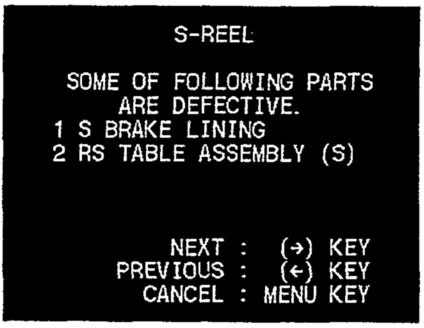
Continues to the next page.


Checks the clearance of the S REEL BRAKE.
NG
Checks the current of the S REEL BRAKE.
NG
OK
The current of the S REEL BRAKE is defective.



```
S-REEL

BRAKE CLEARANCE

CHECK IT.



        NG :   NO KEY
        OK :  YES KEY
    CANCEL : MENU KEY
```

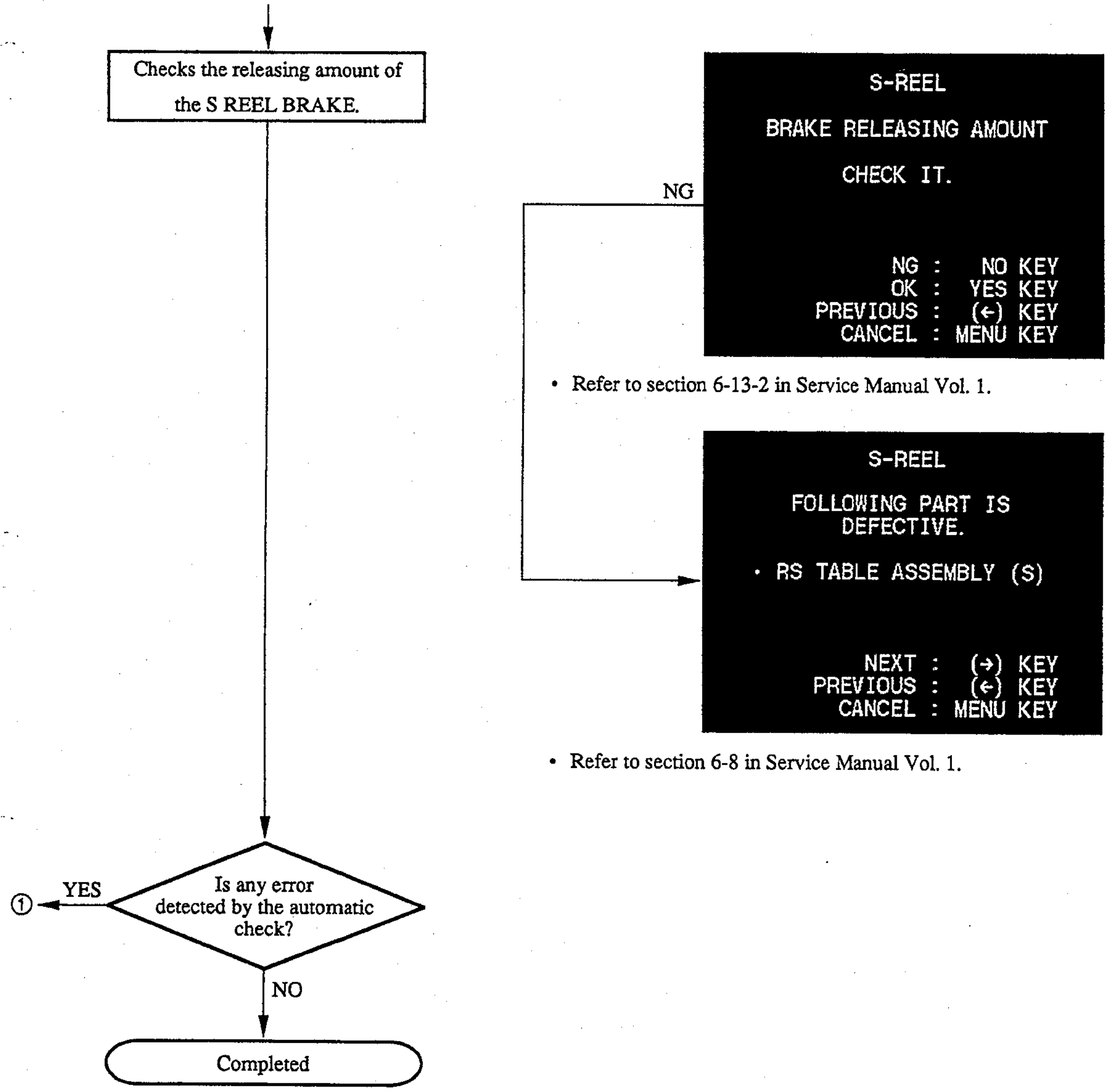
- Refer to section 6-13-1 in Service Manual Vol. 1.



```
S-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 S BRAKE LINING
2 RS TABLE ASSEMBLY (S)


      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

- Refer to sections 6-8 and 6-13 in Service Manual Vol. 1.

- The unit checks the current of the reel brake plunger automatically.

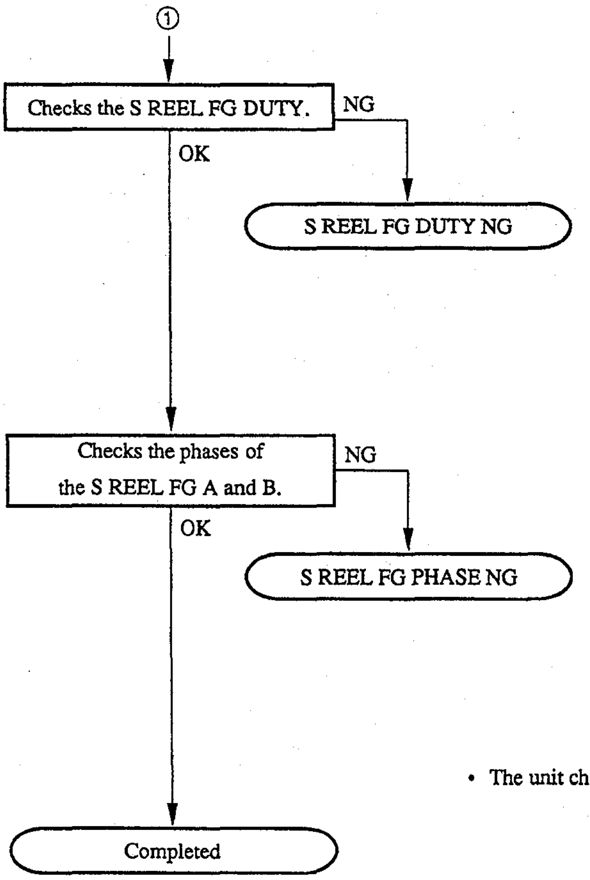

Checks the releasing amount of the S REEL BRAKE.
NG
Is any error detected by the automatic check?
YES
①
NO
Completed

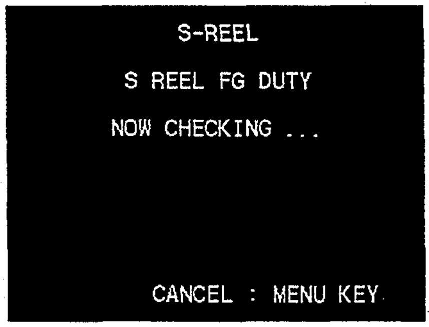
```
S-REEL

BRAKE RELEASING AMOUNT

CHECK IT.


          NG :    NO KEY
          OK :   YES KEY
    PREVIOUS :   (←) KEY
      CANCEL :  MENU KEY
```

- Refer to section 6-13-2 in Service Manual Vol. 1.

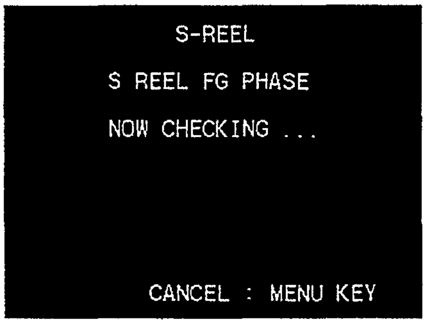
```
S-REEL

FOLLOWING PART IS
DEFECTIVE.

・ RS TABLE ASSEMBLY (S)


        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL :  MENU KEY
```

- Refer to section 6-8 in Service Manual Vol. 1.


①
Checks the S REEL FG DUTY.
NG
OK
S REEL FG DUTY NG
Checks the phases of the S REEL FG A and B.
NG
OK
S REEL FG PHASE NG
Completed

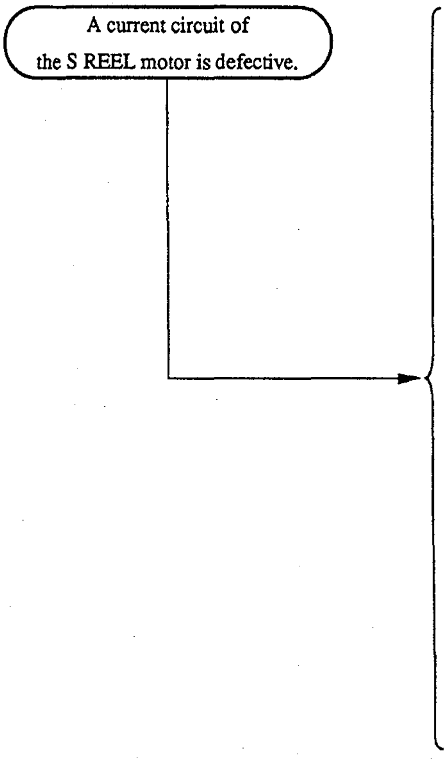


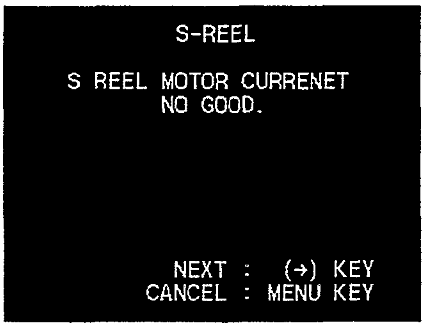
```
S-REEL
S REEL FG DUTY
NOW CHECKING ...



CANCEL : MENU KEY
```



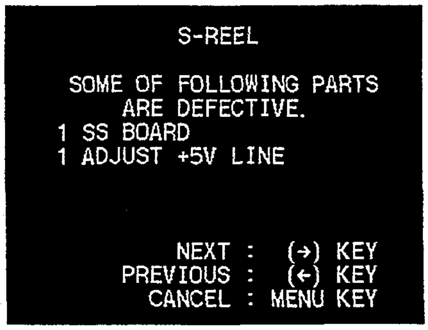
```
S-REEL
S REEL FG PHASE
NOW CHECKING ...



CANCEL : MENU KEY
```

- The unit checks automatically and searches a defective device.


A current circuit of the S REEL motor is defective.

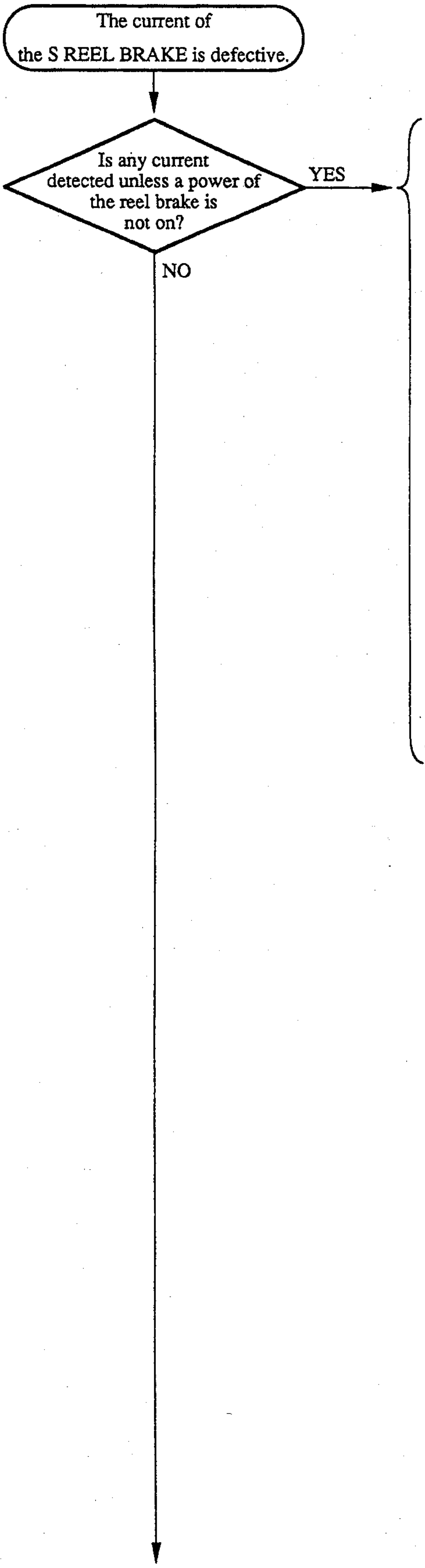


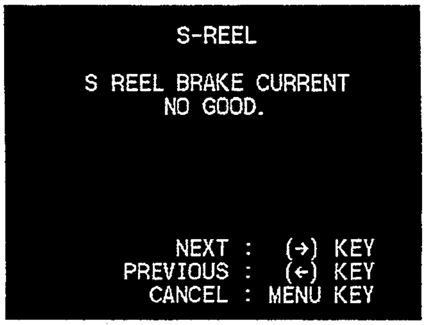
```
S-REEL

S REEL MOTOR CURRENET
NO GOOD.



NEXT :  (→) KEY
CANCEL : MENU KEY
```



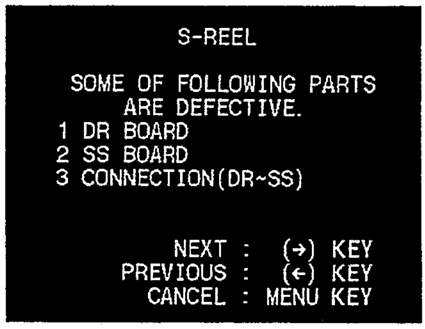
```
S-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 SS BOARD
1 ADJUST +5V LINE


NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

- The probable cause is that an error occurs around an A/D converter for detecting the S reel current.


The current of the S REEL BRAKE is defective.
Is any current detected unless a power of the reel brake is not on?
YES
NO



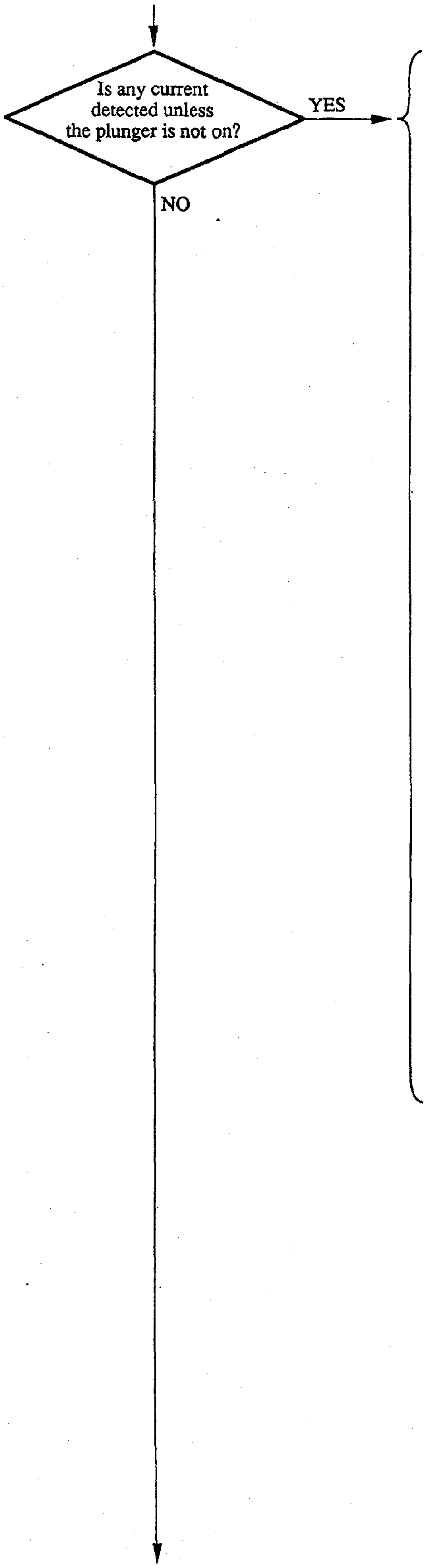
```
S-REEL

S REEL BRAKE CURRENT
NO GOOD.

NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

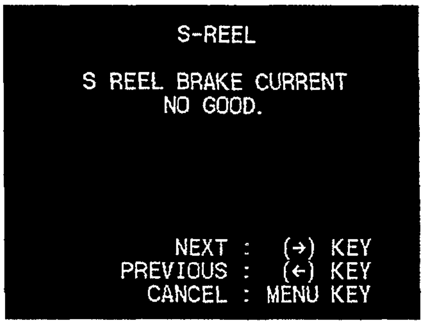


```
S-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 DR BOARD
2 SS BOARD
3 CONNECTION(DR~SS)

NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

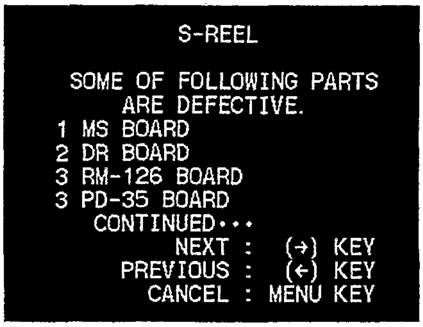
- The probable cause is that the current detecting circuit is defective.

Continues to the next page.

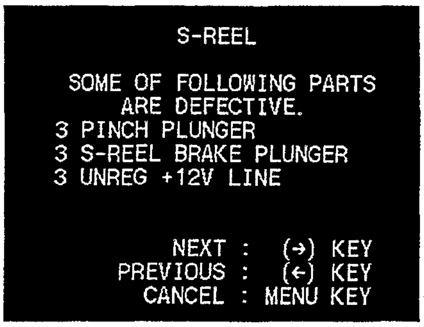




```
              S-REEL

     S REEL BRAKE CURRENT
           NO GOOD.




               NEXT :   (→) KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```

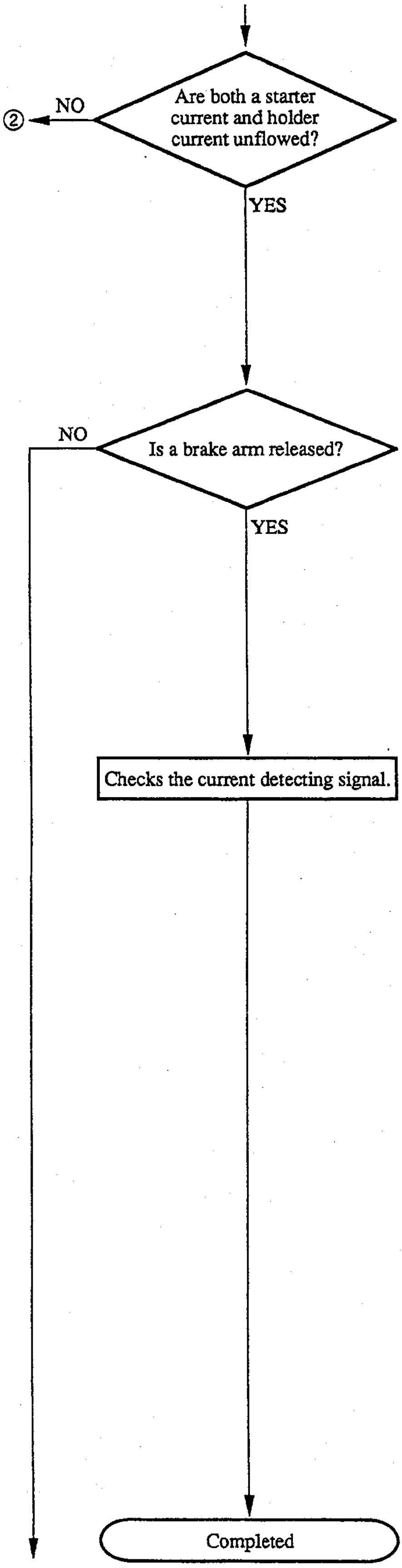


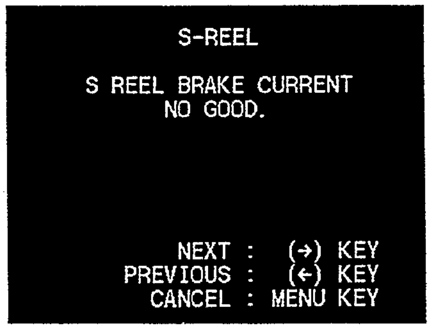
```
              S-REEL

    SOME OF FOLLOWING PARTS
        ARE DEFECTIVE.
  1 MS BOARD
  2 DR BOARD
  3 RM-126 BOARD
  3 PD-35 BOARD
     CONTINUED•••
               NEXT :   (→) KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```



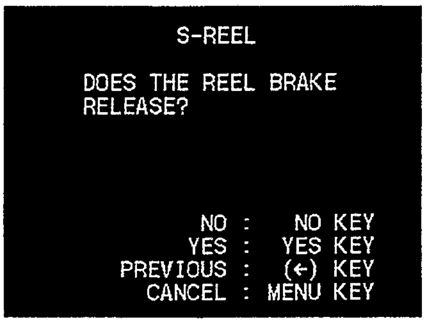
```
              S-REEL

    SOME OF FOLLOWING PARTS
        ARE DEFECTIVE.
  3 PINCH PLUNGER
  3 S-REEL BRAKE PLUNGER
  3 UNREG +12V LINE


               NEXT :   (→) KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```

- One probable cause is that any current is flowed by the cause such as shorting of the signal line.
  The other is that pinch plunger system is defective, because the current detecting circuit is used for both S reel brake and pinch plunger.


②
NO
Are both a starter current and holder current unflowed?
YES
NO
Is a brake arm released?
YES
Checks the current detecting signal.
Completed

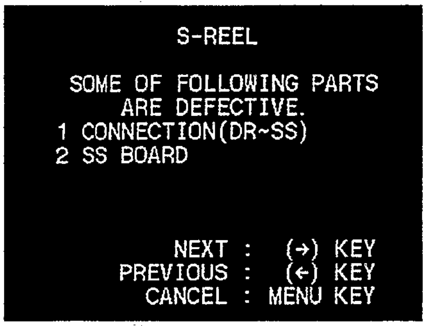


```
S-REEL

S REEL BRAKE CURRENT
NO GOOD.



    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```



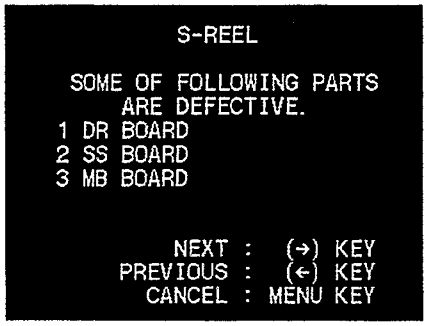
```
S-REEL

DOES THE REEL BRAKE
RELEASE?



      NO :   NO KEY
     YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

- Check that the reel brake is released or not.



```
S-REEL

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 CONNECTION(DR~SS)
2 SS BOARD


    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

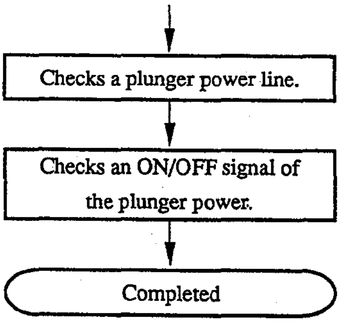
- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

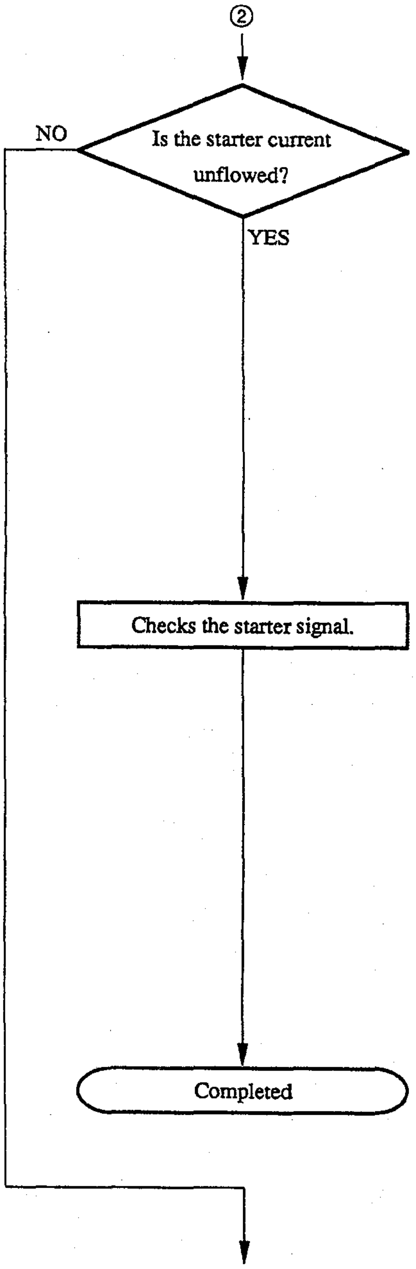


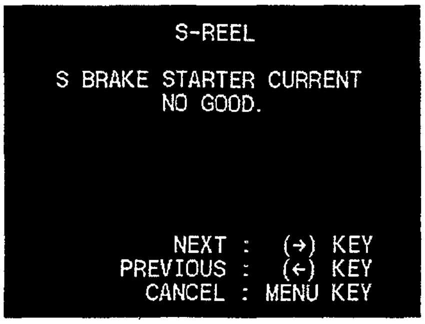
```
S-REEL

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 DR BOARD
2 SS BOARD
3 MB BOARD


    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the SS, MB or DR board.

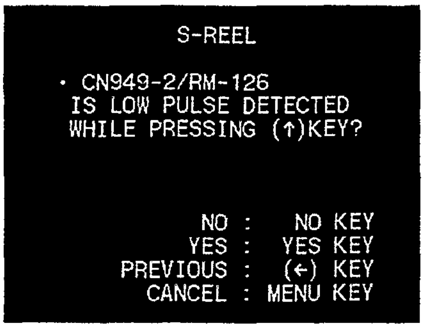
Continues to the next page.


Checks a plunger power line.
Checks an ON/OFF signal of the plunger power.
Completed


②
Is the starter current unflowed?
NO
YES
Checks the starter signal.
Completed

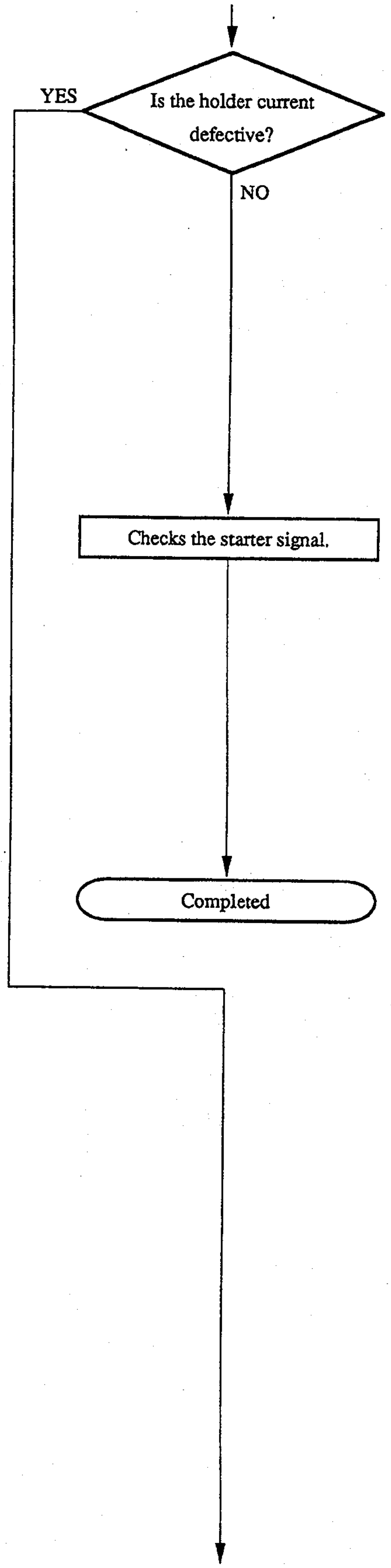


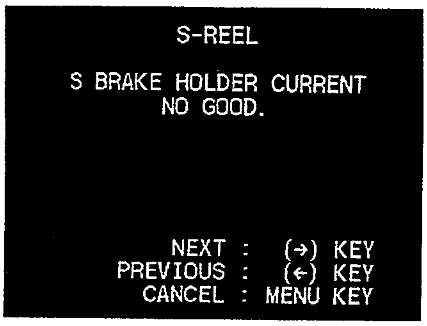
```
S-REEL

S BRAKE STARTER CURRENT
NO GOOD.



     NEXT :  (→) KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```



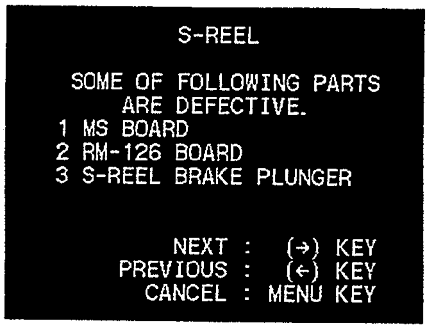
```
S-REEL

 • CN949-2/RM-126
  IS LOW PULSE DETECTED
  WHILE PRESSING (↑)KEY?


       NO :  NO KEY
      YES : YES KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

- Check that about 300 msec pulse is occurred every a second, while pressing the (↑) key.
- Check that the voltage is more than 10 V, while not pressing the (↑) key.


YES
Is the holder current defective?
NO
Checks the starter signal.
Completed



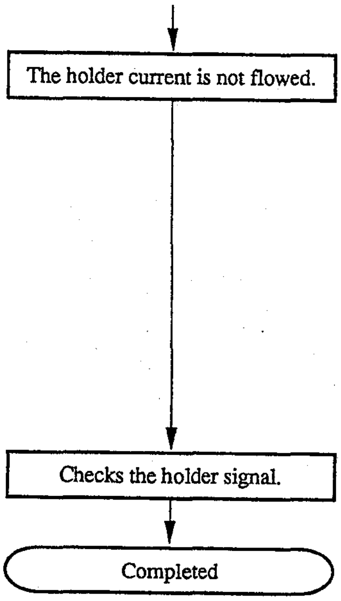
```
            S-REEL

   S BRAKE HOLDER CURRENT
          NO GOOD.




          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

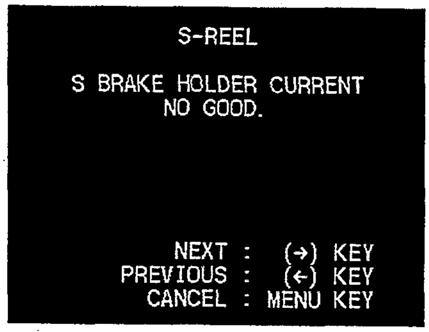


```
            S-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 MS BOARD
 2 RM-126 BOARD
 3 S-REEL BRAKE PLUNGER

          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

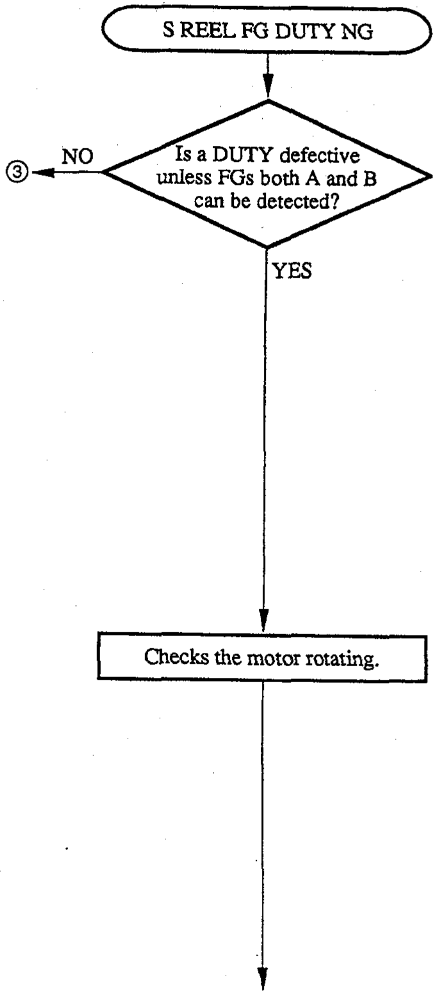
- The starter continues operating.

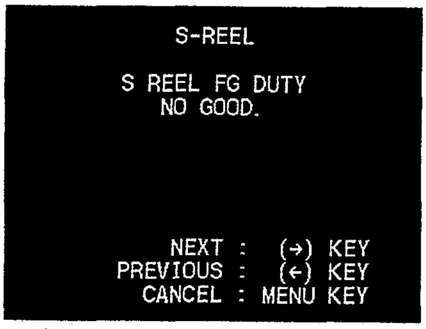
Continues to the next page.


The holder current is not flowed.
Checks the holder signal.
Completed

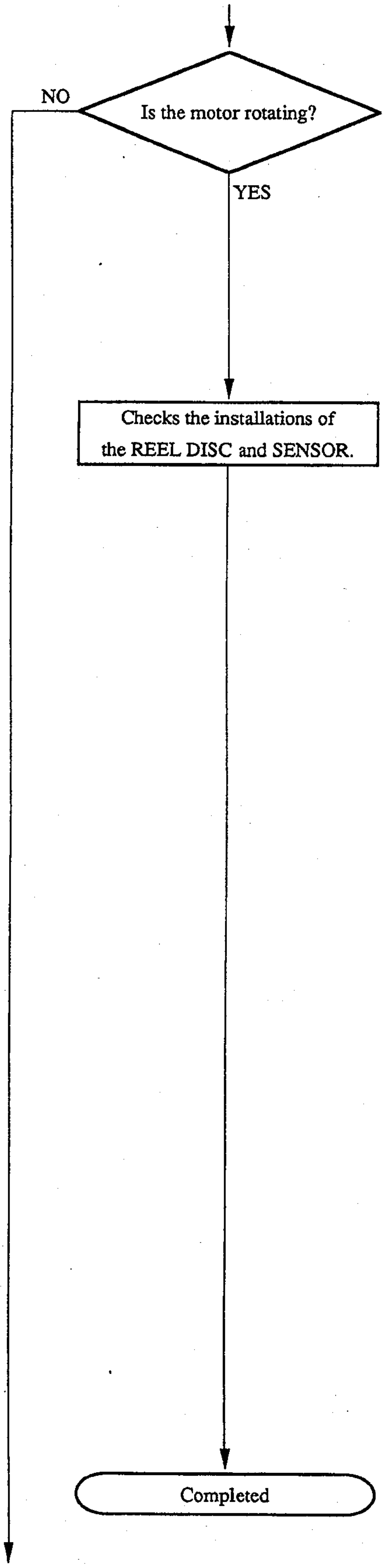


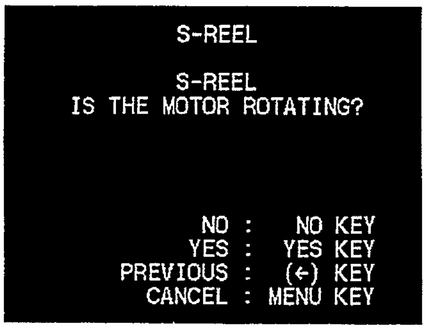
```
S-REEL

S BRAKE HOLDER CURRENT
NO GOOD.



NEXT :   (→) KEY
PREVIOUS :   (←) KEY
CANCEL : MENU KEY
```


S REEL FG DUTY NG
Is a DUTY defective unless FGs both A and B can be detected?
NO
③
YES
Checks the motor rotating.

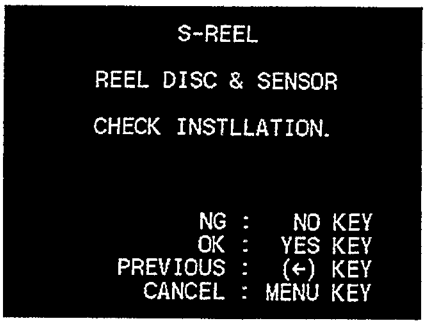


```
S-REEL

S REEL FG DUTY
NO GOOD.



NEXT :   (→) KEY
PREVIOUS :   (←) KEY
CANCEL : MENU KEY
```


NO
Is the motor rotating?
YES
Checks the installations of the REEL DISC and SENSOR.
Completed

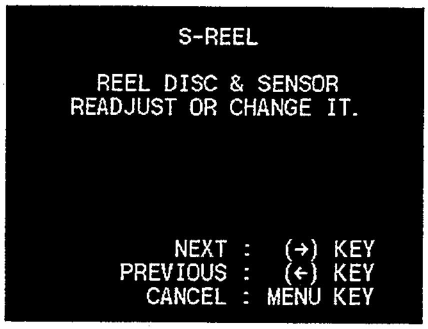


```
          S-REEL

          S-REEL
  IS THE MOTOR ROTATING?




         NO :   NO KEY
        YES :  YES KEY
   PREVIOUS :  (←) KEY
     CANCEL : MENU KEY
```



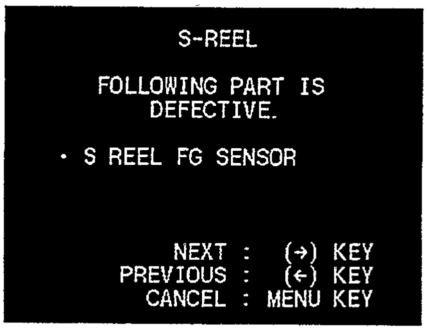
```
          S-REEL

    REEL DISC & SENSOR

    CHECK INSTLLATION.



         NG :   NO KEY
         OK :  YES KEY
   PREVIOUS :  (←) KEY
     CANCEL : MENU KEY
```

- Refer to section 6-7 in Service Manual Vol. 1.



```
          S-REEL

    REEL DISC & SENSOR
  READJUST OR CHANGE IT.





       NEXT :  (→) KEY
   PREVIOUS :  (←) KEY
     CANCEL : MENU KEY
```

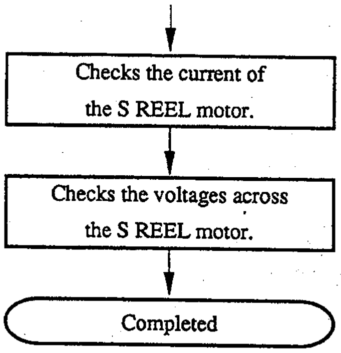
- Refer to section 6-7 in Service Manual Vol. 1.

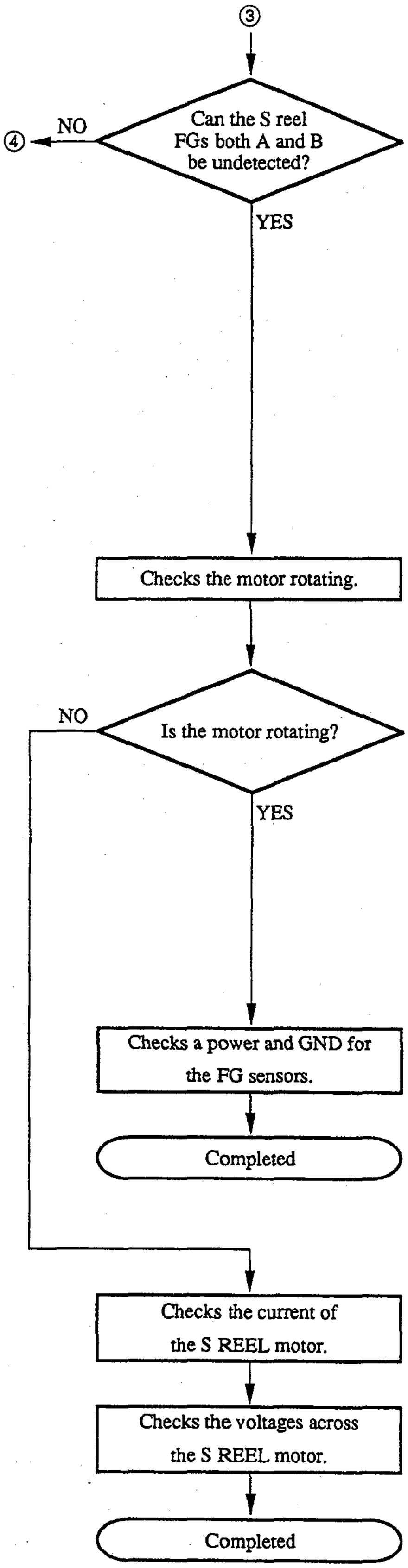


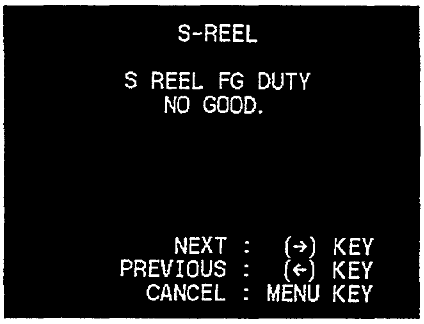
```
          S-REEL

    FOLLOWING PART IS
        DEFECTIVE.

  · S REEL FG SENSOR



       NEXT :  (→) KEY
   PREVIOUS :  (←) KEY
     CANCEL : MENU KEY
```

- The probable cause is that the FG sensors A and B are shorted.

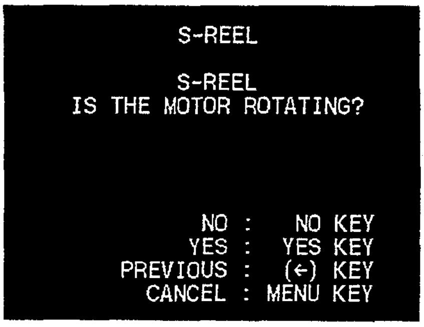
Continues to the next page.


Checks the current of the S REEL motor.
Checks the voltages across the S REEL motor.
Completed

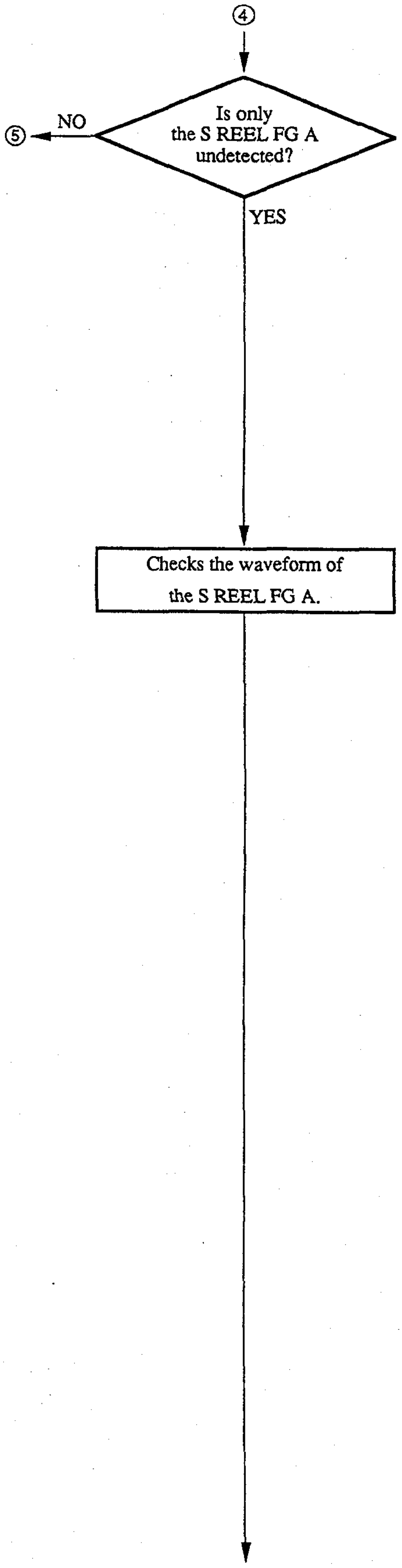

③
Can the S reel FGs both A and B be undetected?
NO
④
YES
Checks the motor rotating.
Is the motor rotating?
NO
YES
Checks a power and GND for the FG sensors.
Completed
Checks the current of the S REEL motor.
Checks the voltages across the S REEL motor.
Completed

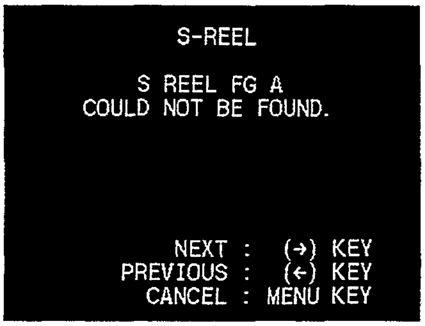


```
          S-REEL

      S REEL FG DUTY
        NO GOOD.



        NEXT :  (→) KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```



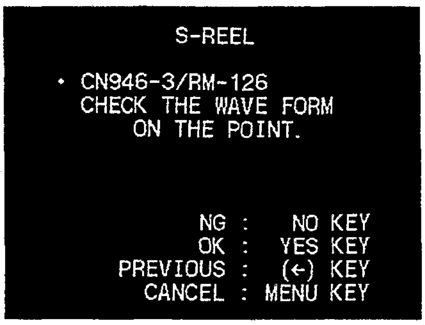
```
          S-REEL

          S-REEL
  IS THE MOTOR ROTATING?



          NO :   NO KEY
         YES :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```


④
Is only the S REEL FG A undetected?
NO
⑤
YES
Checks the waveform of the S REEL FG A.


S-REEL

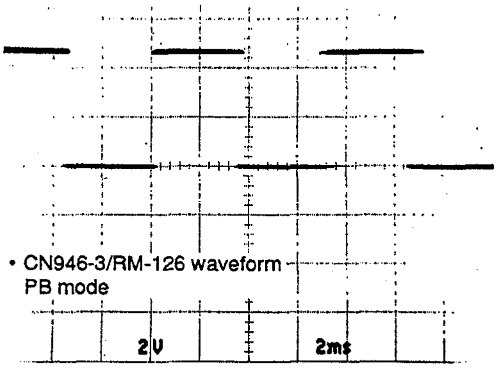
S REEL FG A
COULD NOT BE FOUND.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

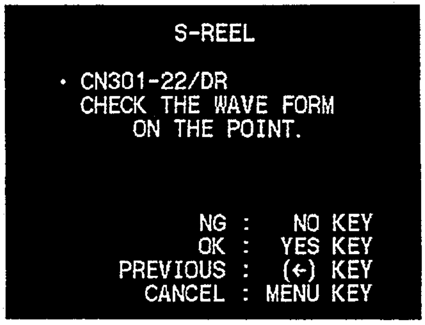

S-REEL

• CN946-3/RM-126
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



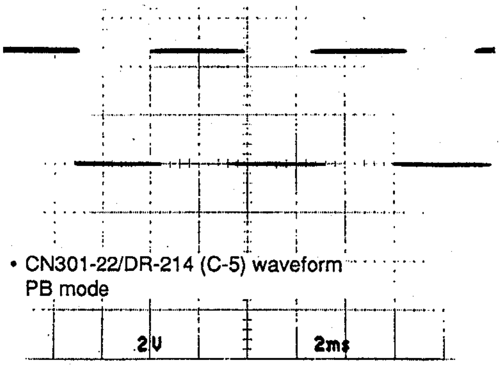
• CN946-3/RM-126 waveform
PB mode



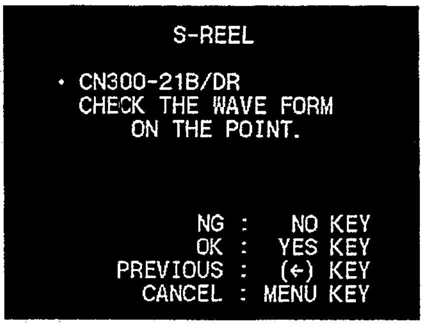
S-REEL

- CN301-22/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



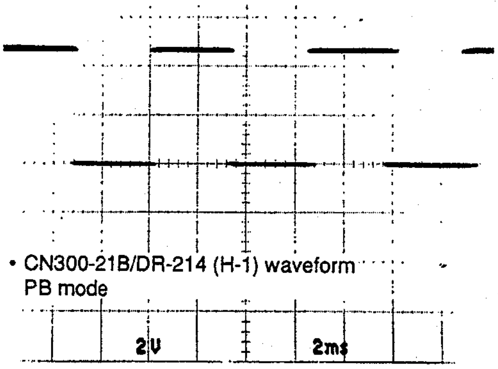
- CN301-22/DR-214 (C-5) waveform
  PB mode



S-REEL

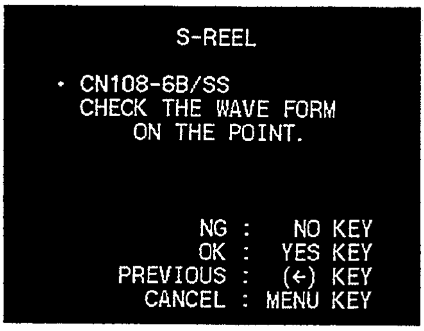
- CN300-21B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

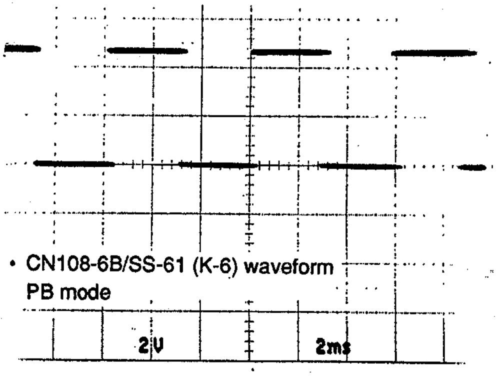


- CN300-21B/DR-214 (H-1) waveform
  PB mode

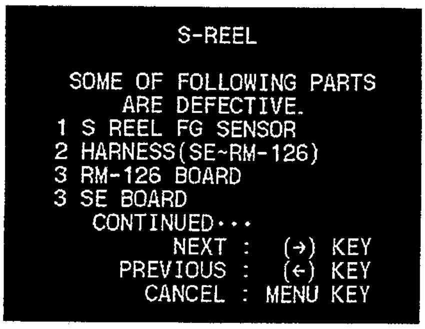
Continues to the next page.



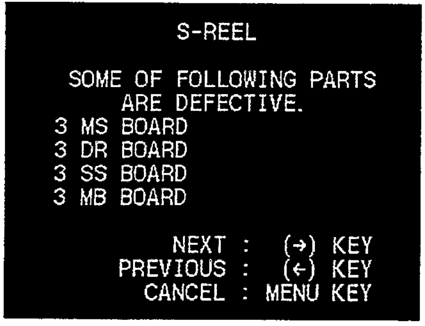
```
            S-REEL

 • CN108-6B/SS
   CHECK THE WAVE FORM
       ON THE POINT.



              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```



• CN108-6B/SS-61 (K-6) waveform
PB mode



```
            S-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 S REEL FG SENSOR
 2 HARNESS(SE~RM-126)
 3 RM-126 BOARD
 3 SE BOARD
   CONTINUED···
             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

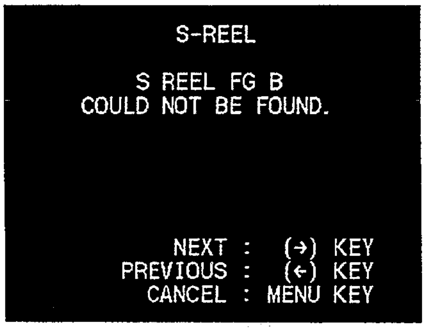


```
            S-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 3 MS BOARD
 3 DR BOARD
 3 SS BOARD
 3 MB BOARD

             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

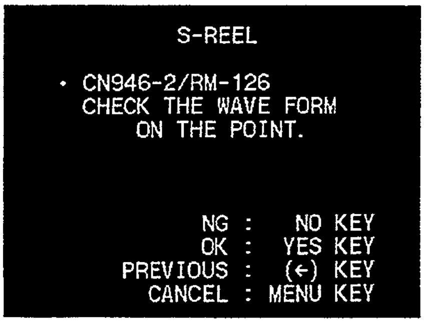
Completed

⑤

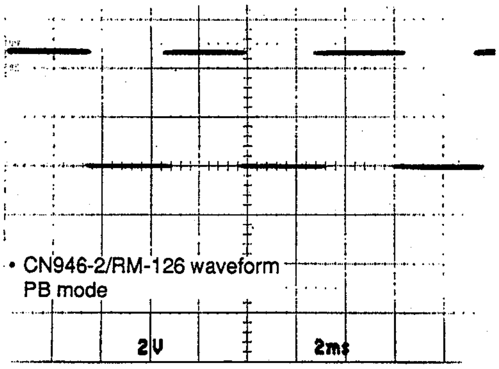


```
                S-REEL

            S REEL FG B
       COULD NOT BE FOUND.




               NEXT :  (→) KEY
           PREVIOUS :  (←) KEY
             CANCEL : MENU KEY
```

Checks the waveform of the S REEL FG B.

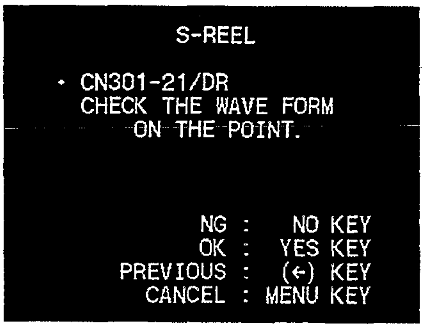


```
                S-REEL

     • CN946-2/RM-126
       CHECK THE WAVE FORM
           ON THE POINT.


                 NG :   NO KEY
                 OK :  YES KEY
           PREVIOUS :  (←) KEY
             CANCEL : MENU KEY
```



• CN946-2/RM-126 waveform
PB mode

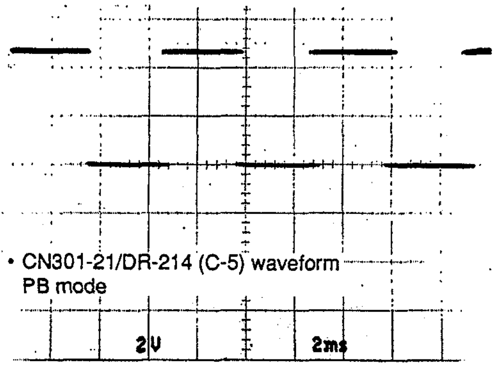
Continues to the next page.



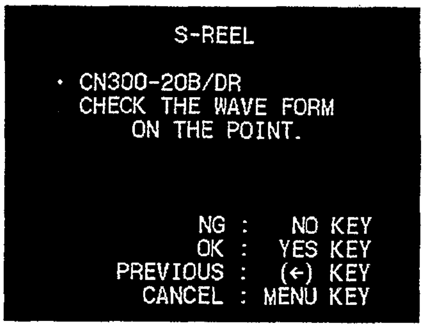
S-REEL

- CN301-21/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



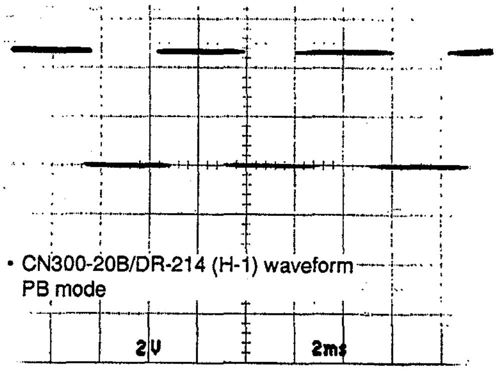
- CN301-21/DR-214 (C-5) waveform
  PB mode



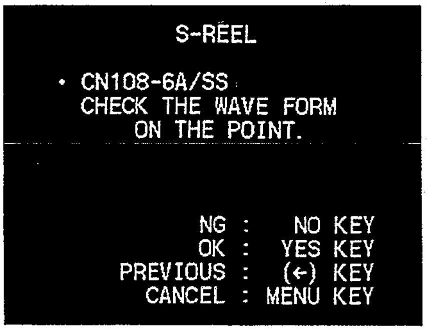
S-REEL

- CN300-20B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

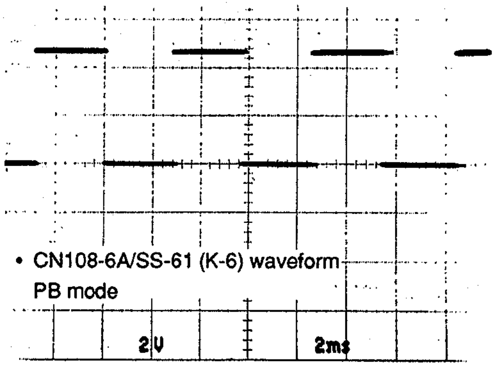
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



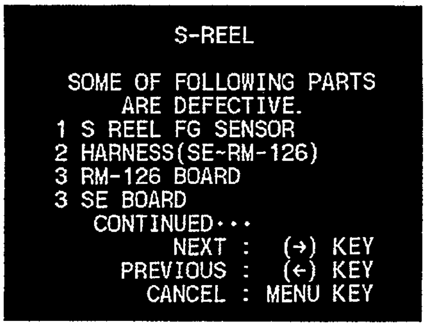
- CN300-20B/DR-214 (H-1) waveform
  PB mode



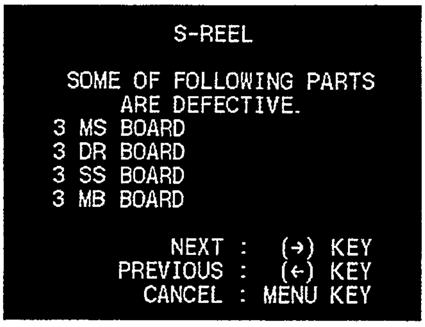
```
S-REEL

• CN108-6A/SS
  CHECK THE WAVE FORM
     ON THE POINT.



              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```



- CN108-6A/SS-61 (K-6) waveform
  PB mode



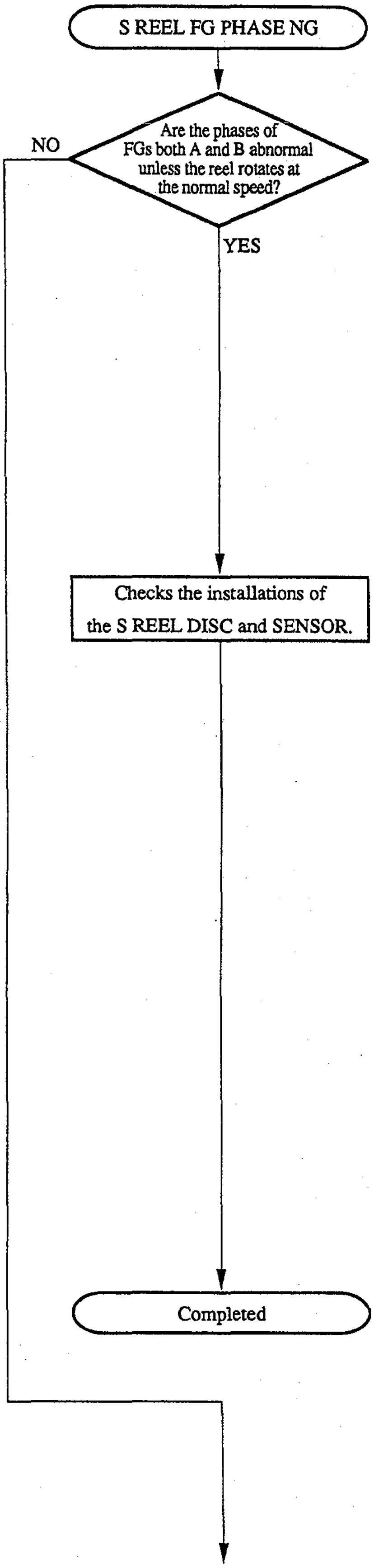
```
S-REEL

 SOME OF FOLLOWING PARTS
     ARE DEFECTIVE.
1 S REEL FG SENSOR
2 HARNESS(SE-RM-126)
3 RM-126 BOARD
3 SE BOARD
  CONTINUED···
            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

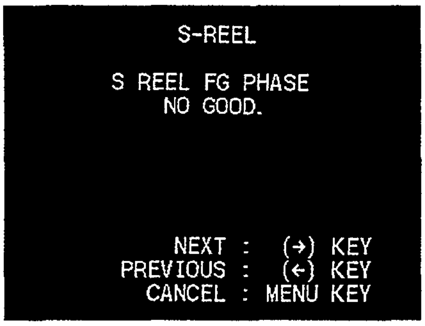


```
S-REEL

 SOME OF FOLLOWING PARTS
     ARE DEFECTIVE.
3 MS BOARD
3 DR BOARD
3 SS BOARD
3 MB BOARD

            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

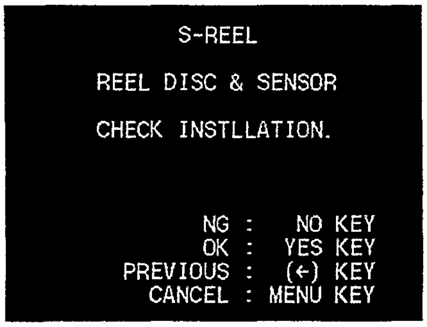
- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

Completed


S REEL FG PHASE NG
Are the phases of FGs both A and B abnormal unless the reel rotates at the normal speed?
NO
YES
Checks the installations of the S REEL DISC and SENSOR.
Completed

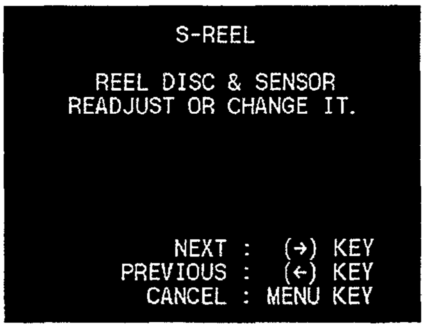


```
             S-REEL

        S REEL FG PHASE
            NO GOOD.




              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```



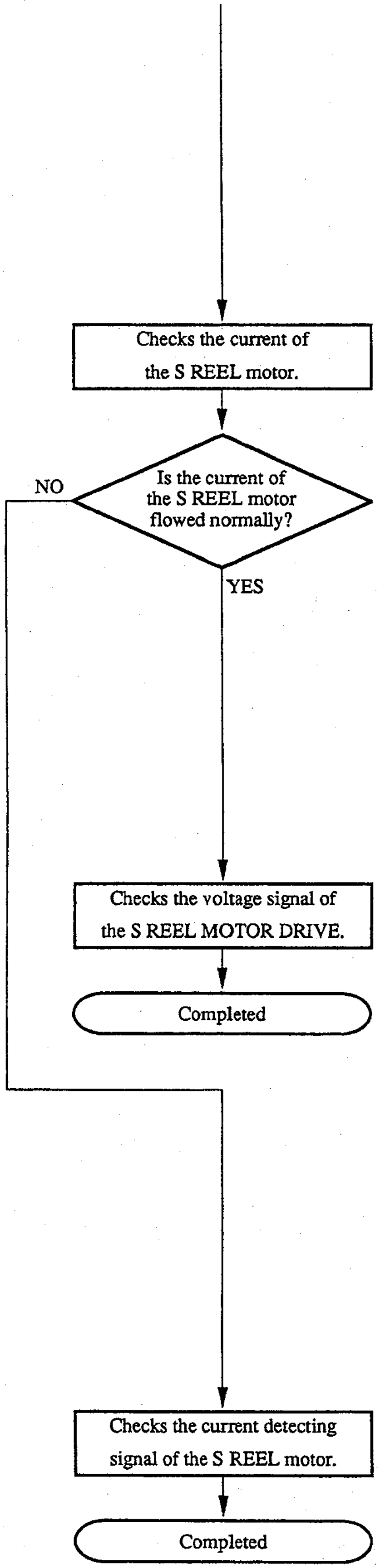
```
             S-REEL

      REEL DISC & SENSOR

      CHECK INSTLLATION.



                NG :    NO KEY
                OK :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

- Refer to section 6-7 in Service Manual Vol. 1.

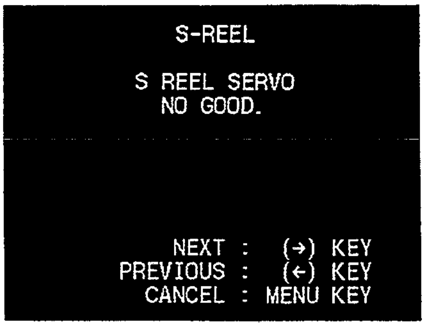


```
             S-REEL

      REEL DISC & SENSOR
    READJUST OR CHANGE IT.




              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

- Refer to section 6-7 in Service Manual Vol. 1.

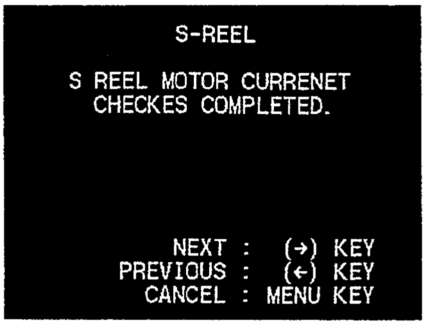

Checks the current of the S REEL motor.
Is the current of the S REEL motor flowed normally?
NO
YES
Checks the voltage signal of the S REEL MOTOR DRIVE.
Completed
Checks the current detecting signal of the S REEL motor.
Completed

- The unit checks automatically.


S-REEL

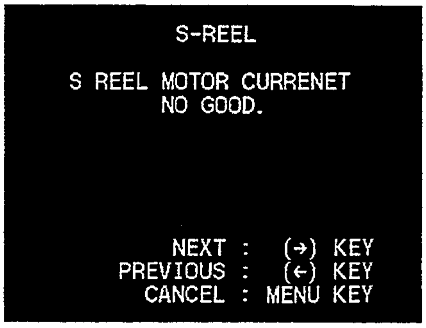
S REEL SERVO
NO GOOD.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY


S-REEL

S REEL MOTOR CURRENET
CHECKES COMPLETED.

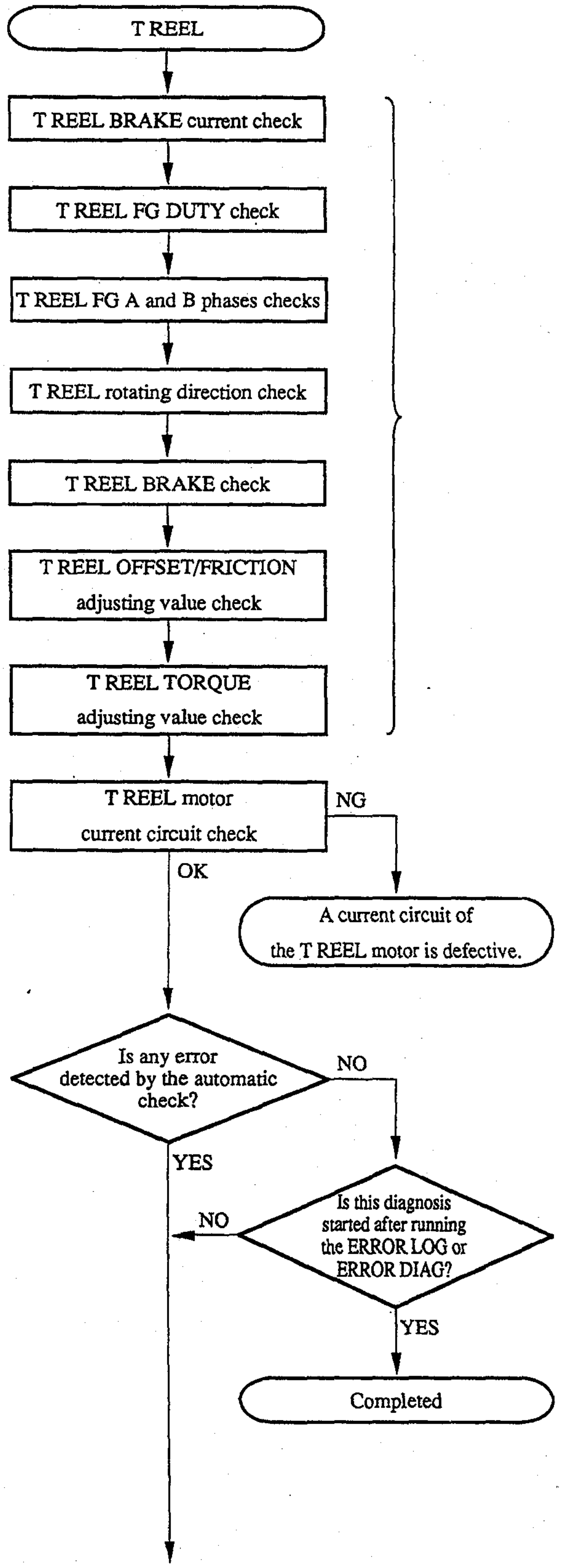
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

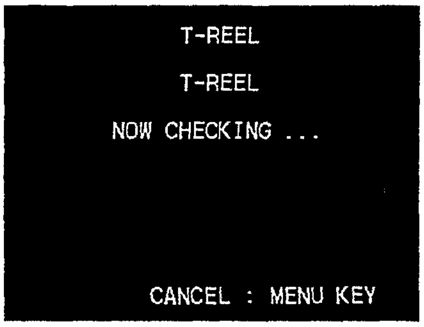

S-REEL

S REEL MOTOR CURRENET
NO GOOD.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

(8) T REEL Diagnosis

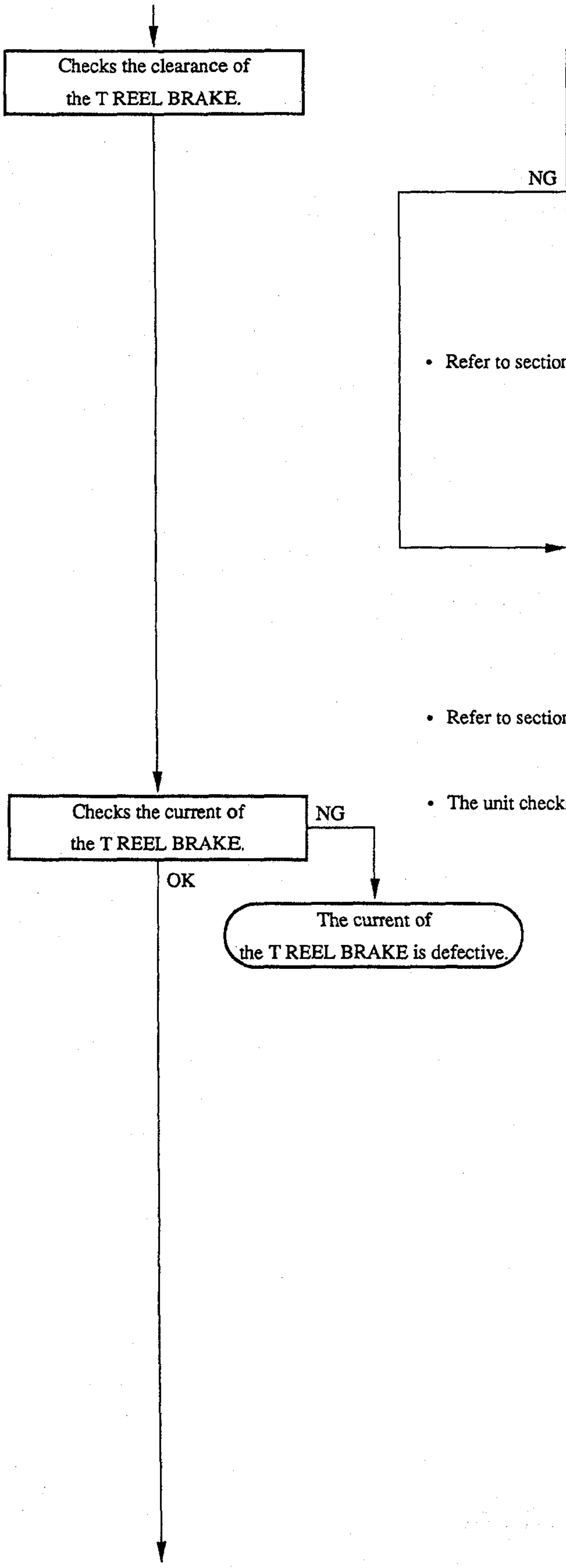

T REEL
T REEL BRAKE current check
T REEL FG DUTY check
T REEL FG A and B phases checks
T REEL rotating direction check
T REEL BRAKE check
T REEL OFFSET/FRICTION adjusting value check
T REEL TORQUE adjusting value check
T REEL motor current circuit check
NG
OK
A current circuit of the T REEL motor is defective.
Is any error detected by the automatic check?
NO
YES
Is this diagnosis started after running the ERROR LOG or ERROR DIAG?
NO
YES
Completed

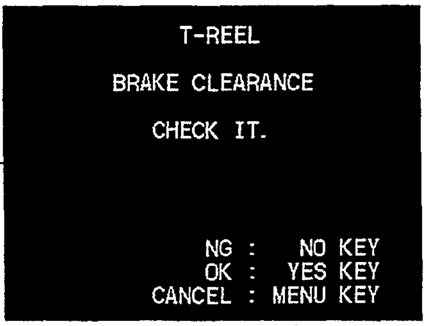


```
T-REEL
T-REEL
NOW CHECKING ...

CANCEL : MENU KEY
```

- The unit checks automatically.

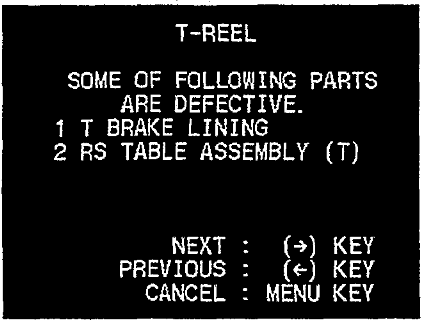
- If the automatic check is completed at this step, after running the ERROR LOG or ERROR DIAG, the check is completed. Then, the diagnosis is proceeded to the next step.


Checks the clearance of the T REEL BRAKE.
NG
Checks the current of the T REEL BRAKE.
NG
OK
The current of the T REEL BRAKE is defective.



```
T-REEL

BRAKE CLEARANCE

CHECK IT.



           NG :   NO KEY
           OK :  YES KEY
       CANCEL : MENU KEY
```

- Refer to section 6-13-1 in Service Manual Vol. 1.

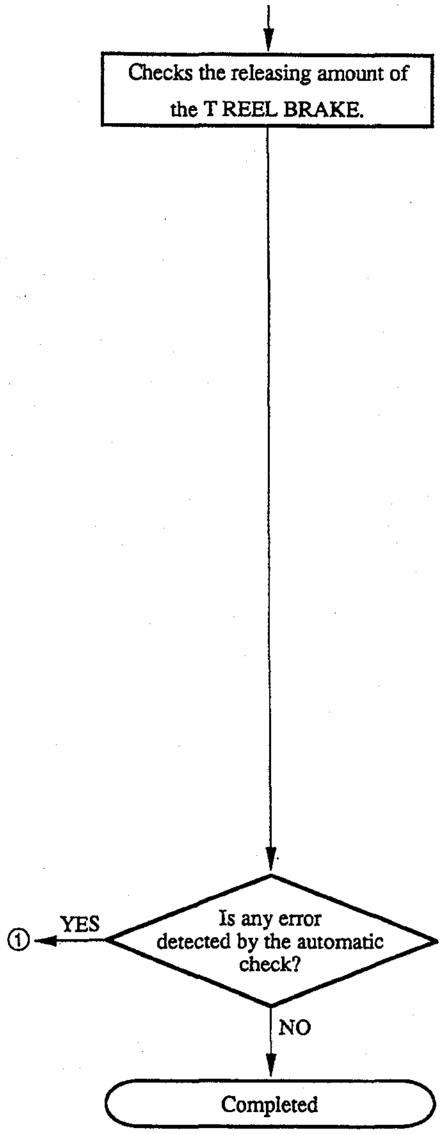


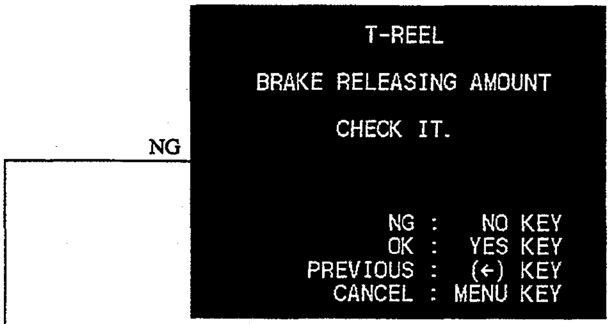
```
T-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
1 T BRAKE LINING
2 RS TABLE ASSEMBLY (T)



         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```

- Refer to sections 6-8 and 6-13 in Service Manual Vol. 1.

- The unit checks the current of the reel brake plunger automatically.

Continues to the next page.


Checks the releasing amount of the T REEL BRAKE.
YES
①
Is any error detected by the automatic check?
NO
Completed



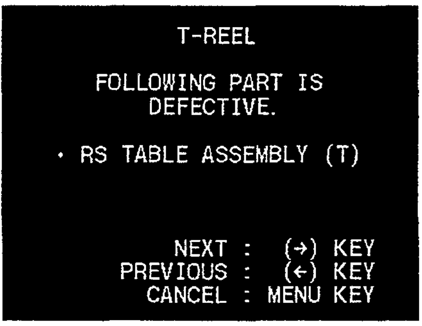
T-REEL

BRAKE RELEASING AMOUNT

CHECK IT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- Refer to section 6-13-2 in Service Manual Vol. 1.



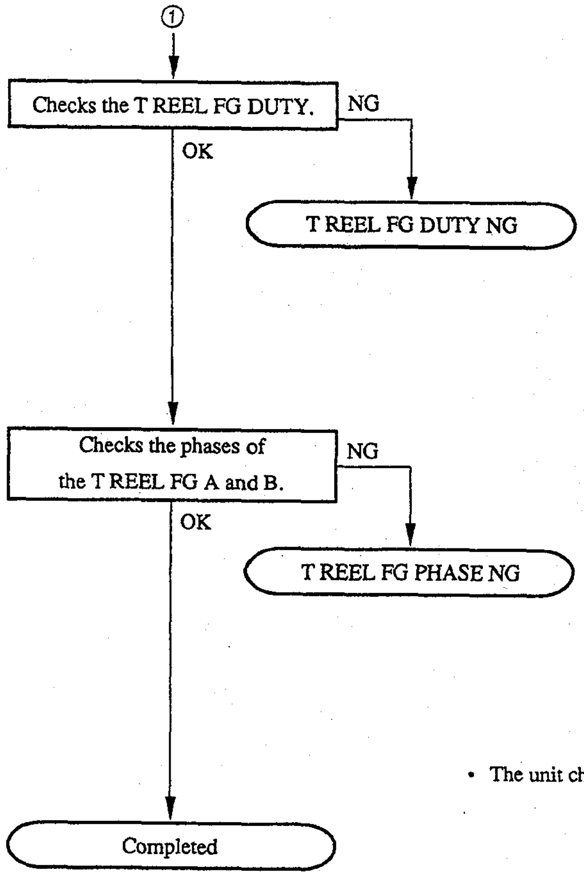
T-REEL

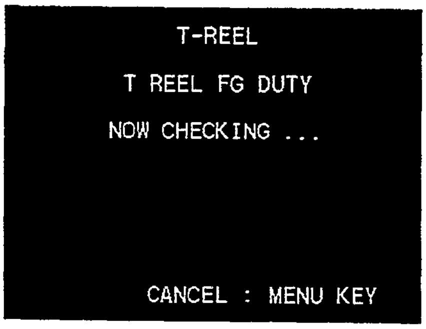
FOLLOWING PART IS DEFECTIVE.

• RS TABLE ASSEMBLY (T)

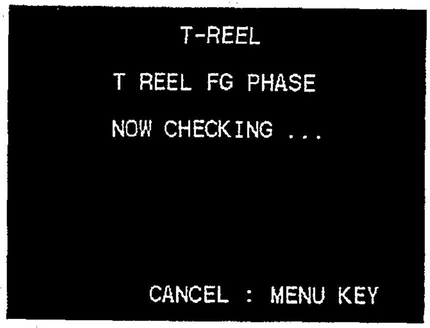
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- Refer to section 6-8 in Service Manual Vol. 1.


①
Checks the T REEL FG DUTY.
NG
OK
T REEL FG DUTY NG
Checks the phases of the T REEL FG A and B.
NG
OK
T REEL FG PHASE NG
Completed

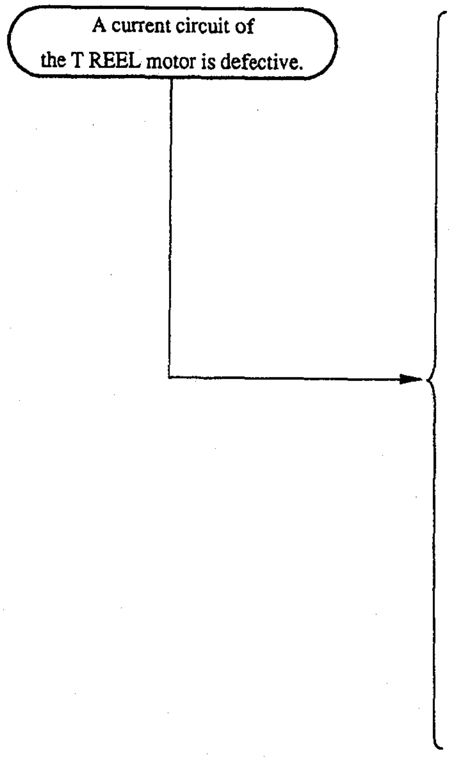


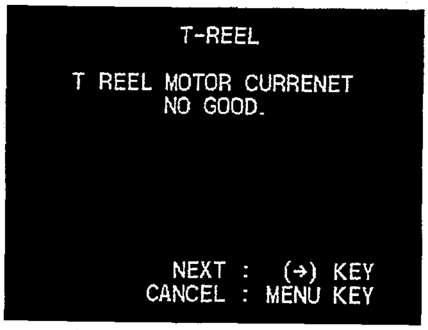
```
T-REEL

T REEL FG DUTY

NOW CHECKING ...



CANCEL : MENU KEY
```



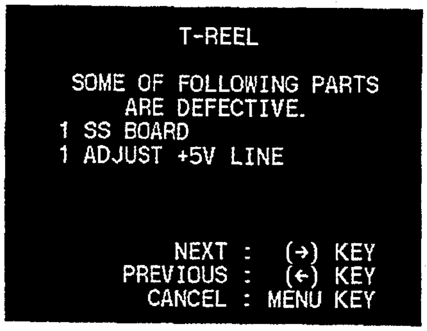
```
T-REEL

T REEL FG PHASE

NOW CHECKING ...



CANCEL : MENU KEY
```

- The unit checks automatically and searches a defective device.


A current circuit of the T REEL motor is defective.

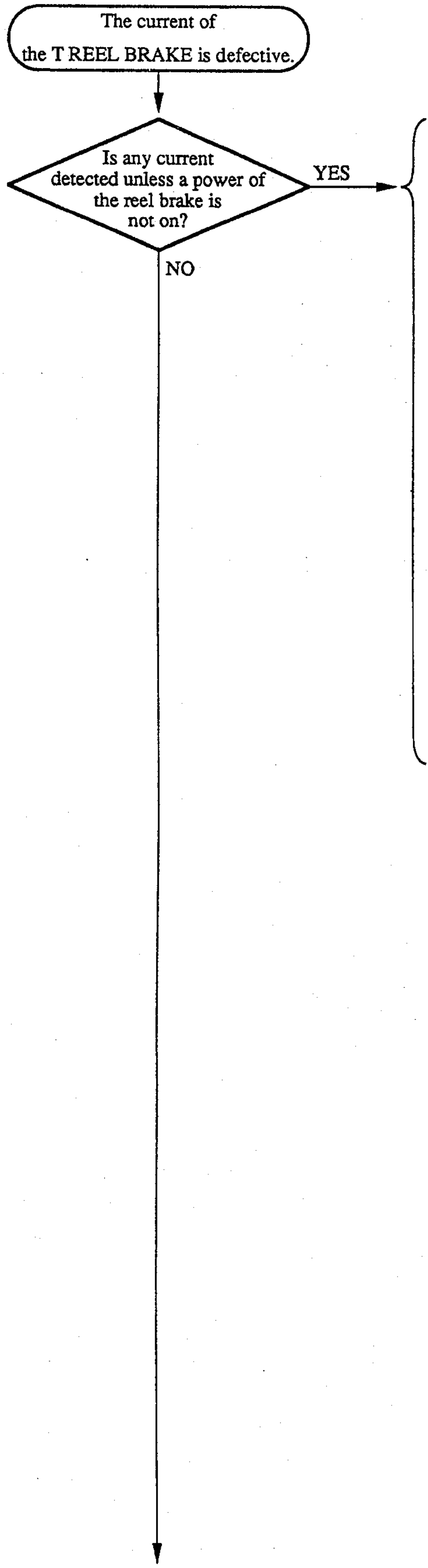


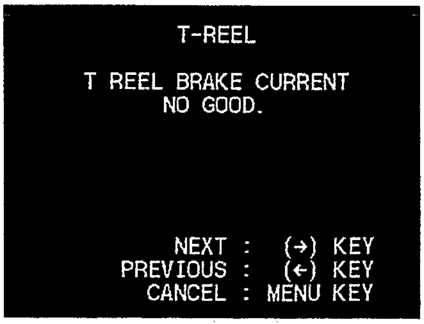
```
T-REEL

T REEL MOTOR CURRENET
NO GOOD.



    NEXT :  (→) KEY
  CANCEL : MENU KEY
```



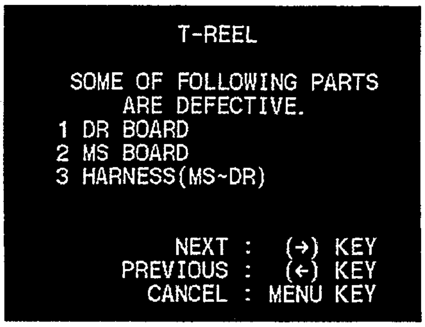
```
T-REEL

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 SS BOARD
1 ADJUST +5V LINE


    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

- The probable cause is that an error occurs around an A/D converter for detecting the T reel current.


The current of the T REEL BRAKE is defective.
Is any current detected unless a power of the reel brake is not on?
YES
NO

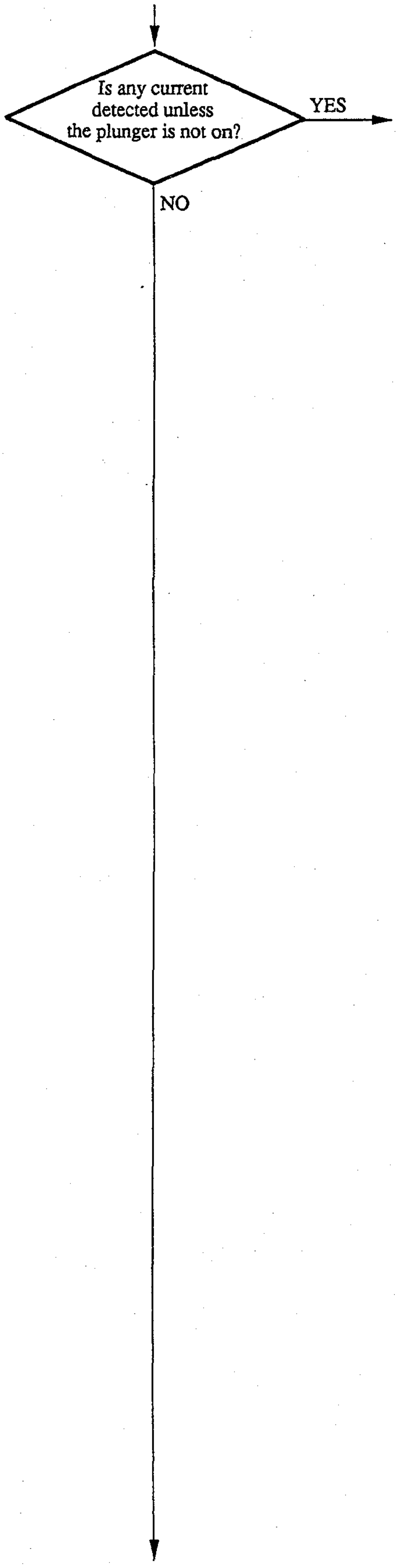


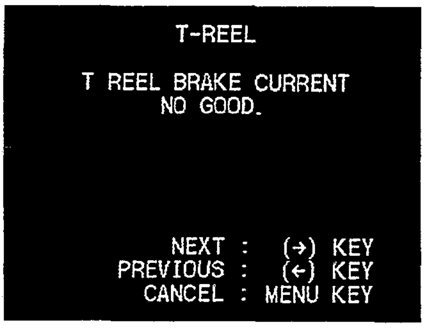
```
              T-REEL

      T REEL BRAKE CURRENT
              NO GOOD.




              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```



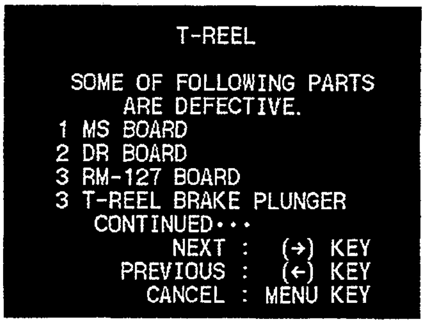
```
              T-REEL

     SOME OF FOLLOWING PARTS
          ARE DEFECTIVE.
    1 DR BOARD
    2 MS BOARD
    3 HARNESS(MS~DR)

              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

- The probable cause is that the current detecting circuit is defective.

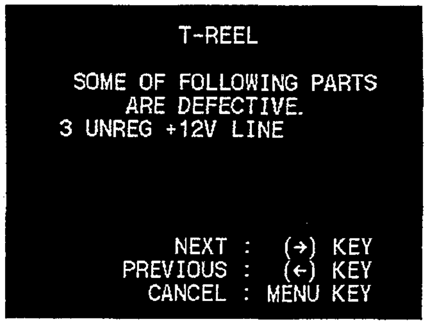

Is any current detected unless the plunger is not on?
YES
NO



```
            T-REEL

   T REEL BRAKE CURRENT
         NO GOOD.




             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```



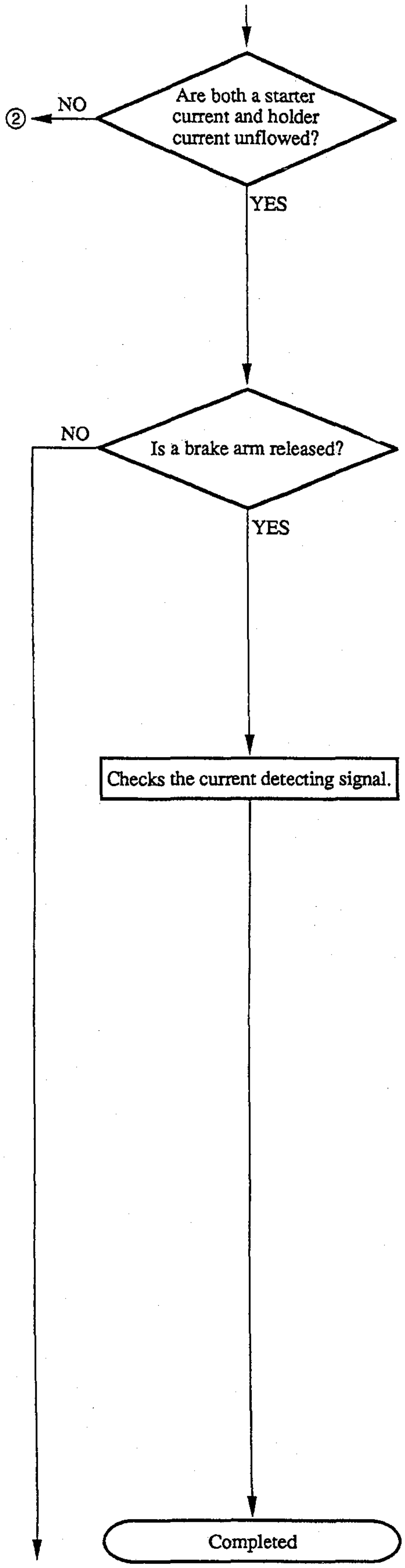
```
            T-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 MS BOARD
 2 DR BOARD
 3 RM-127 BOARD
 3 T-REEL BRAKE PLUNGER
   CONTINUED・・・
             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

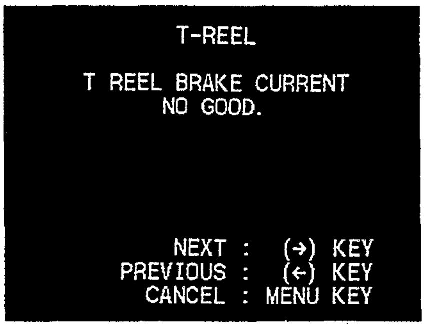


```
            T-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 3 UNREG +12V LINE




             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

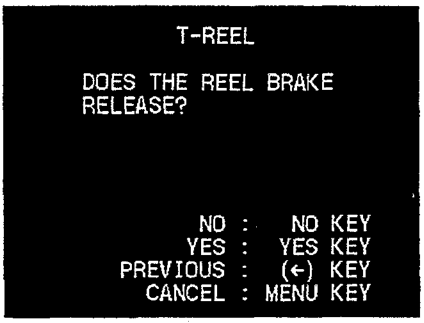
- The probable cause is that any current is flowed by the cause such as shorting of the signal line.

Continues to the next page.


Are both a starter current and holder current unflowed?
NO
②
YES
Is a brake arm released?
NO
YES
Checks the current detecting signal.
Completed

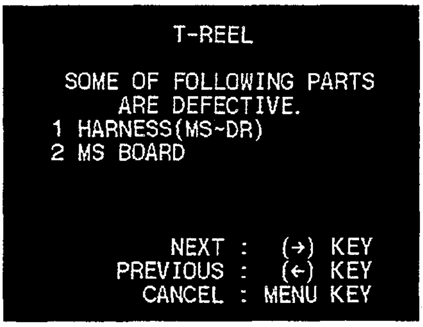


```
T-REEL

T REEL BRAKE CURRENT
NO GOOD.



NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```



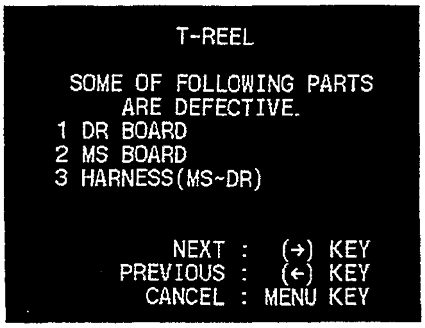
```
T-REEL

DOES THE REEL BRAKE
RELEASE?



NO :   NO KEY
YES :  YES KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

- Check that the reel brake is released or not.



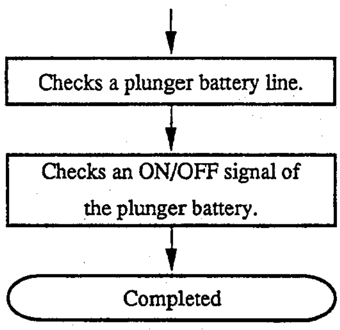
```
T-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 HARNESS(MS~DR)
2 MS BOARD


NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

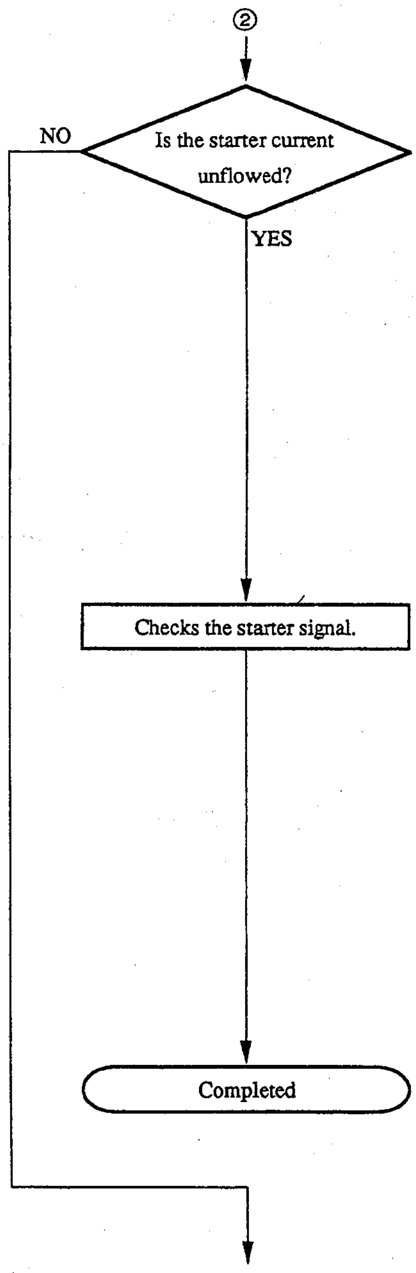
- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

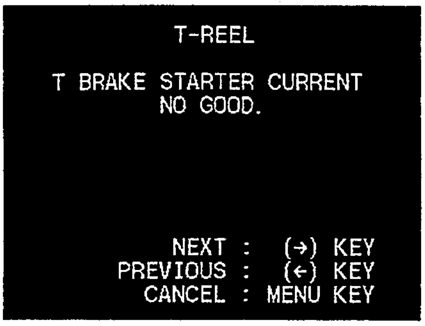


```
T-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 DR BOARD
2 MS BOARD
3 HARNESS(MS~DR)

NEXT :  (→) KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

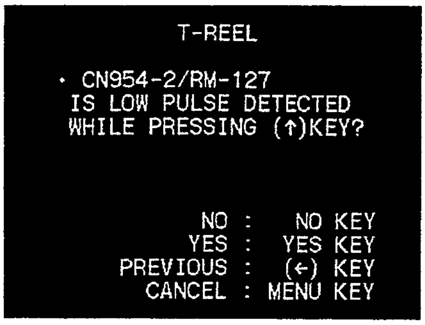
- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the MB or DR board.


Checks a plunger battery line.
Checks an ON/OFF signal of the plunger battery.
Completed


②
Is the starter current unflowed?
NO
YES
Checks the starter signal.
Completed



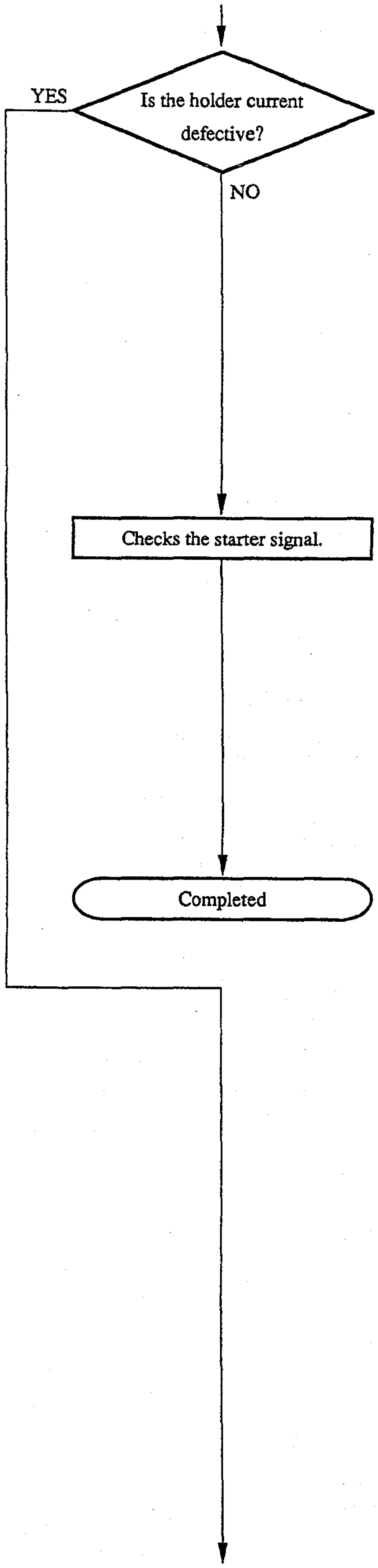
```
                T-REEL

   T BRAKE STARTER CURRENT
           NO GOOD.




                NEXT :   (→) KEY
            PREVIOUS :   (←) KEY
              CANCEL :  MENU KEY
```

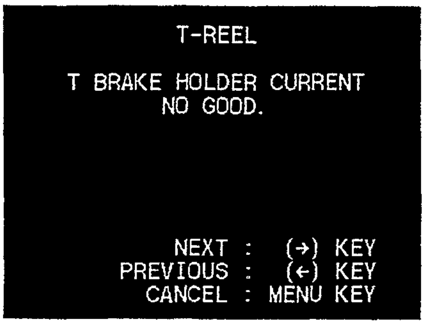


```
                T-REEL

   • CN954-2/RM-127
    IS LOW PULSE DETECTED
    WHILE PRESSING (↑)KEY?


                  NO :    NO KEY
                 YES :   YES KEY
            PREVIOUS :   (←) KEY
              CANCEL :  MENU KEY
```

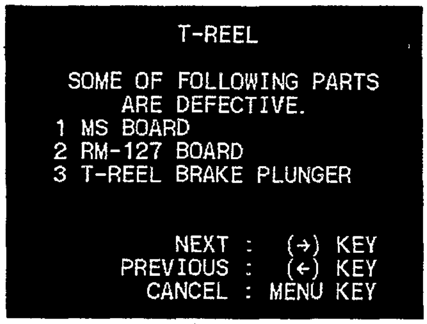
- Check that about 300 msec pulse is occurred every a second, while pressing the (↑) key.
- Check that the voltage is more than 10 V, while not pressing the (↑) key.

Continues to the next page.


YES
Is the holder current defective?
NO
Checks the starter signal.
Completed

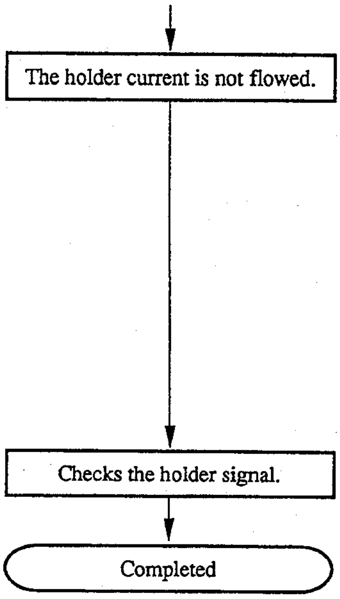


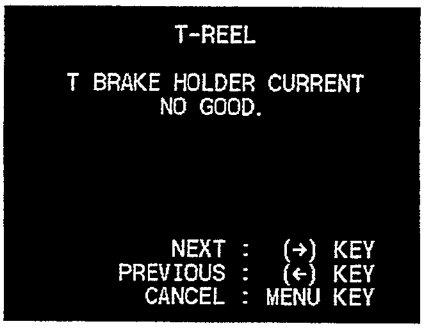
```
              T-REEL

     T BRAKE HOLDER CURRENT
            NO GOOD.




               NEXT :   (→) KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```



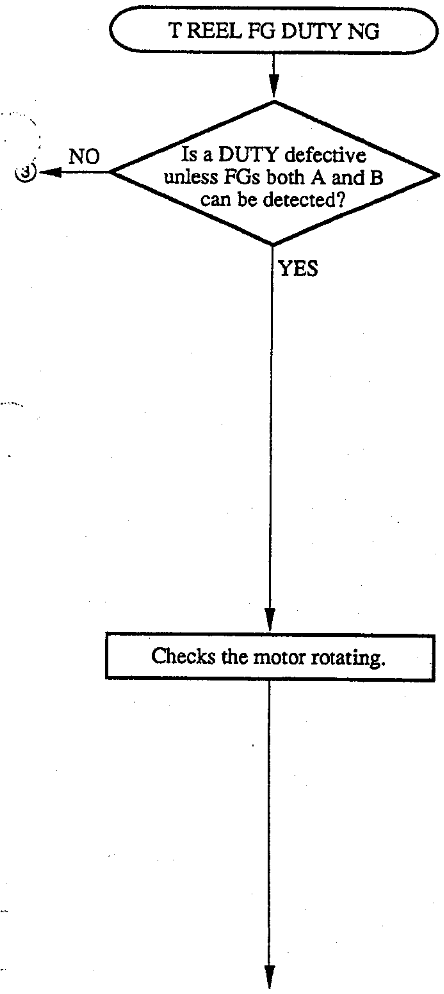
```
              T-REEL

     SOME OF FOLLOWING PARTS
          ARE DEFECTIVE.
    1 MS BOARD
    2 RM-127 BOARD
    3 T-REEL BRAKE PLUNGER


               NEXT :   (→) KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```

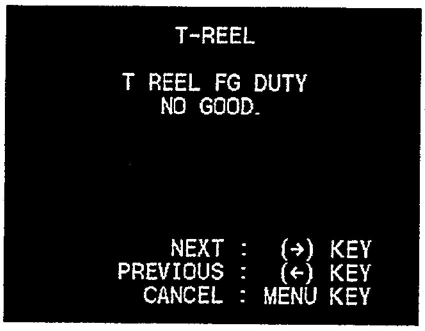
- The starter continues operating.


The holder current is not flowed.
Checks the holder signal.
Completed



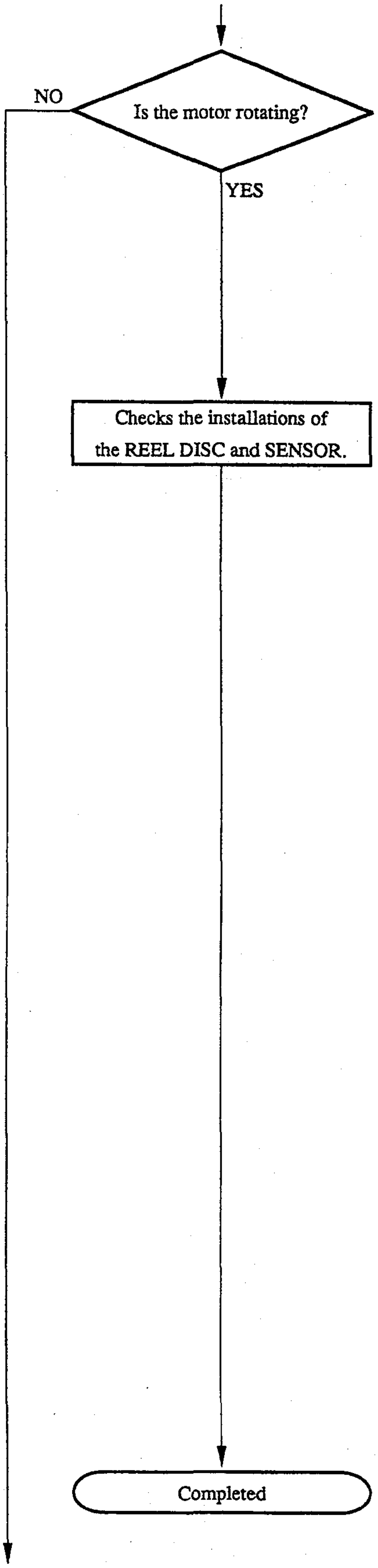
```
            T-REEL

   T BRAKE HOLDER CURRENT
         NO GOOD.




        NEXT :    (→) KEY
    PREVIOUS :    (←) KEY
      CANCEL :  MENU KEY
```

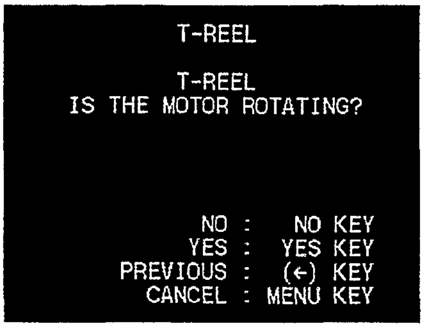

T REEL FG DUTY NG
Is a DUTY defective unless FGs both A and B can be detected?
NO
③
YES
Checks the motor rotating.



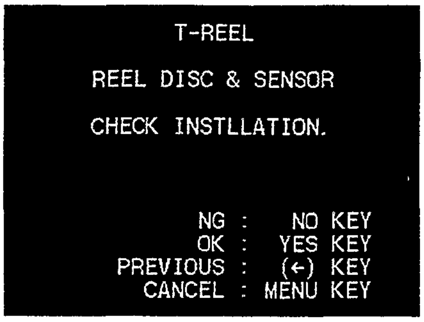
```
            T-REEL

       T REEL FG DUTY
         NO GOOD.




        NEXT :    (→) KEY
    PREVIOUS :    (←) KEY
      CANCEL :  MENU KEY
```

Continues to the next page.


NO
Is the motor rotating?
YES
Checks the installations of the REEL DISC and SENSOR.
Completed

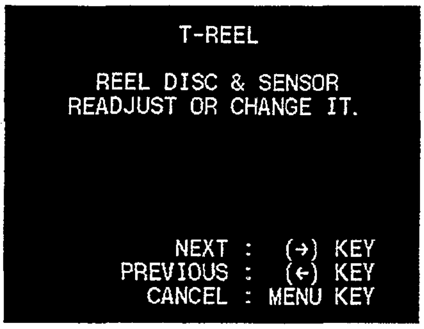


```
T-REEL

T-REEL
IS THE MOTOR ROTATING?




        NO :   NO KEY
       YES :  YES KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```



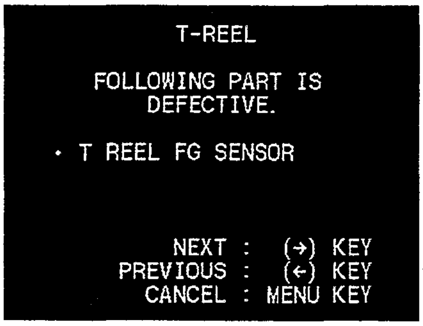
```
T-REEL

REEL DISC & SENSOR

CHECK INSTLLATION.



        NG :   NO KEY
        OK :  YES KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

- Refer to section 6-7 in Service Manual Vol. 1.



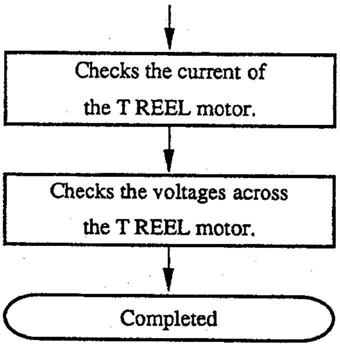
```
T-REEL

REEL DISC & SENSOR
READJUST OR CHANGE IT.






      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

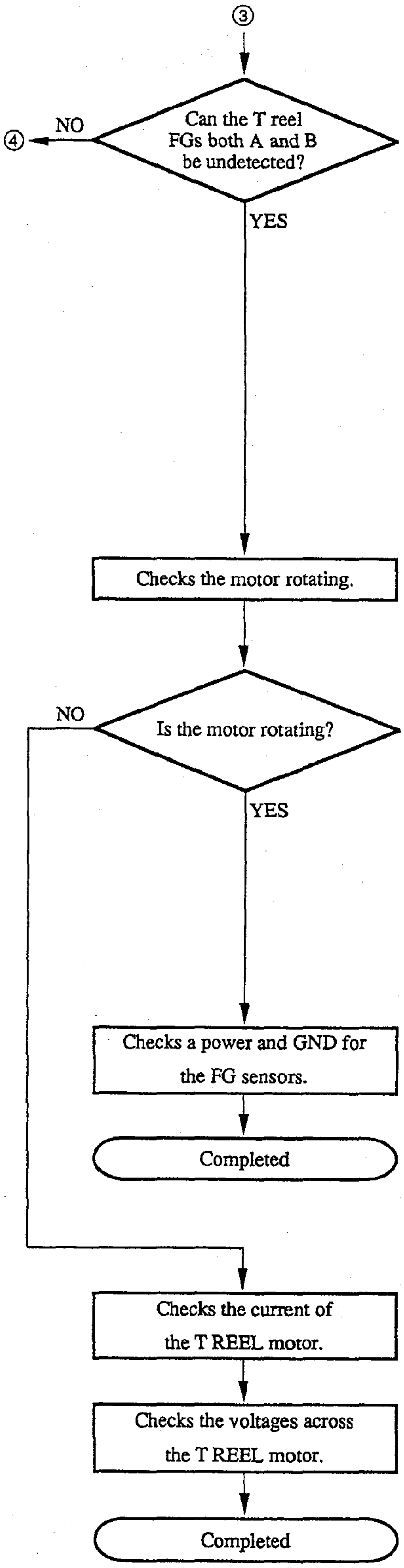
- Refer to section 6-7 in Service Manual Vol. 1.

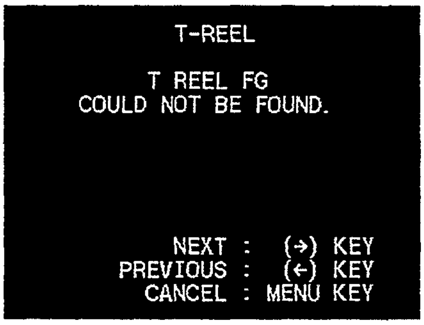


```
T-REEL

FOLLOWING PART IS
DEFECTIVE.

・ T REEL FG SENSOR



      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

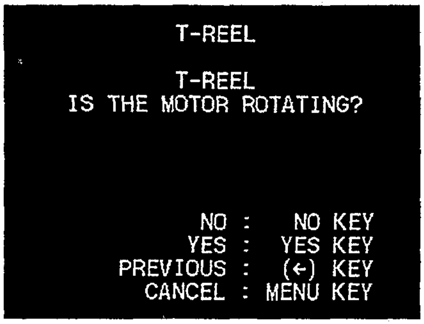
- The probable cause is that the FG sensors A and B are shorted.


Checks the current of the T REEL motor.
Checks the voltages across the T REEL motor.
Completed

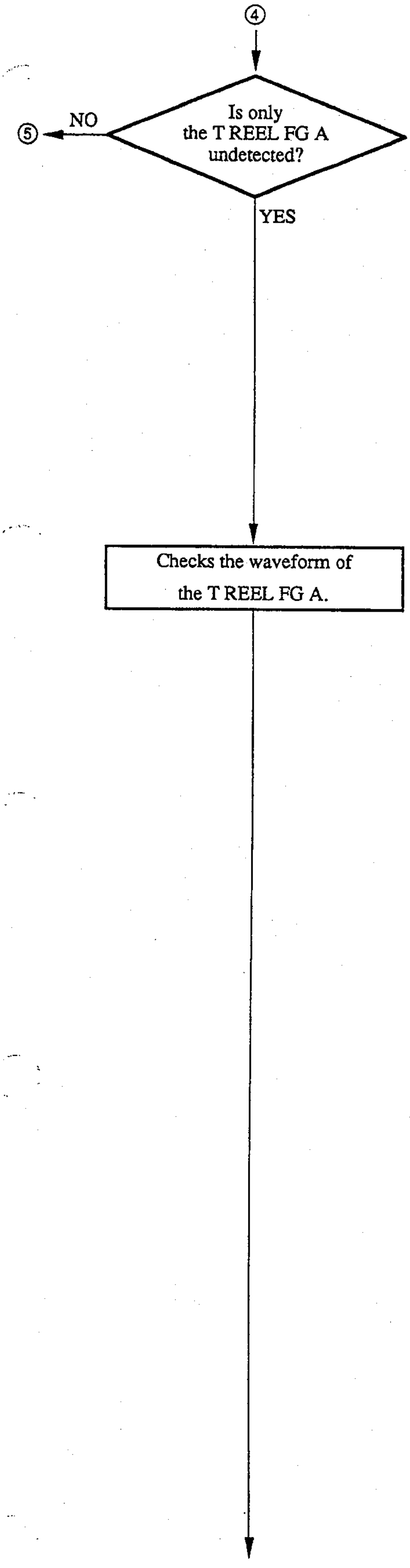

③
Can the T reel FGs both A and B be undetected?
NO
④
YES
Checks the motor rotating.
Is the motor rotating?
NO
YES
Checks a power and GND for the FG sensors.
Completed
Checks the current of the T REEL motor.
Checks the voltages across the T REEL motor.
Completed

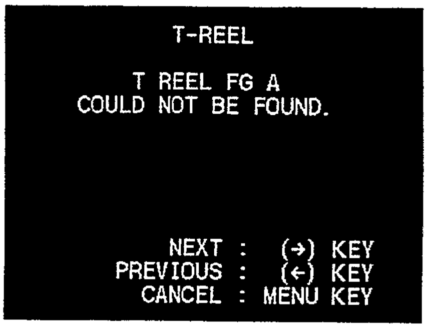


```
             T-REEL

           T REEL FG
      COULD NOT BE FOUND.




          NEXT :  (→) KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```



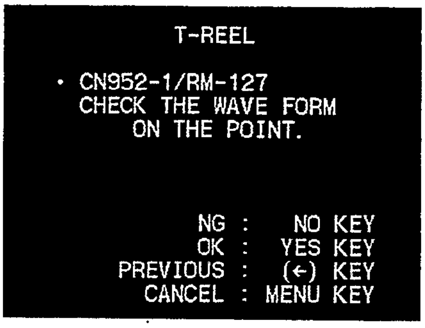
```
             T-REEL

             T-REEL
     IS THE MOTOR ROTATING?




            NO :   NO KEY
           YES :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```


④
NO
⑤
Is only the T REEL FG A undetected?
YES
Checks the waveform of the T REEL FG A.


T-REEL

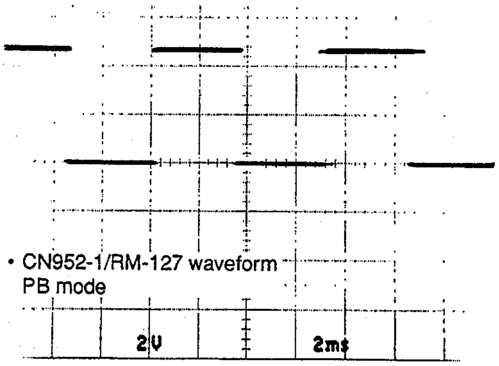
T REEL FG A
COULD NOT BE FOUND.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY


T-REEL

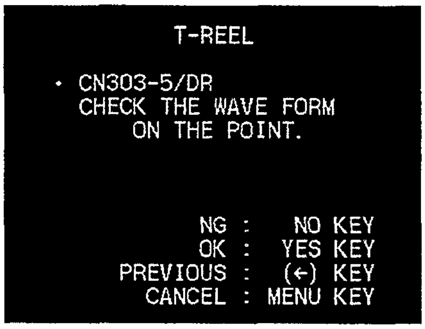
- CN952-1/RM-127
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



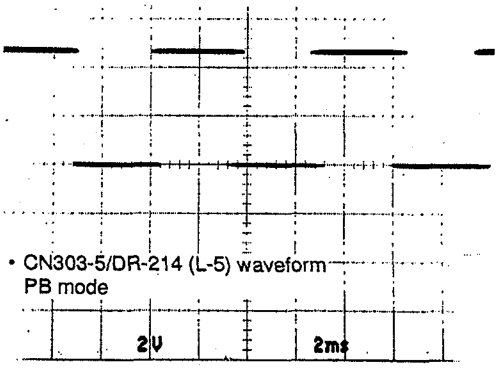
- CN952-1/RM-127 waveform
  PB mode

Continues to the next page.

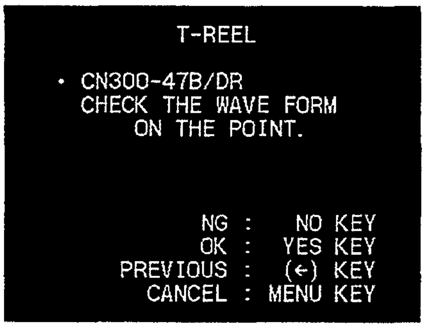

T-REEL

- CN303-5/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

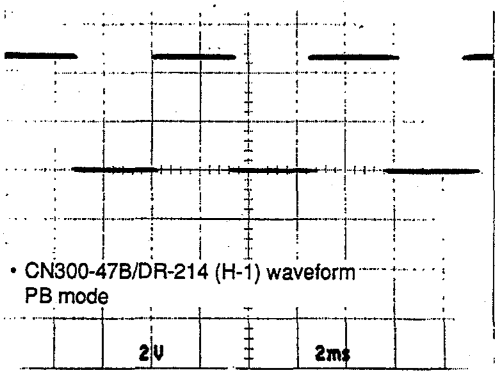


- CN303-5/DR-214 (L-5) waveform
  PB mode

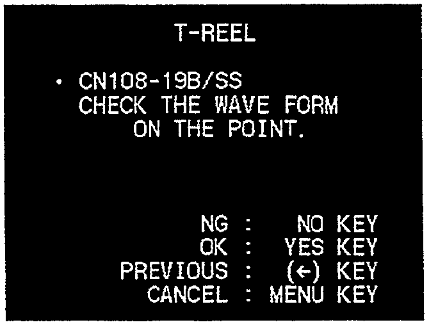

T-REEL

- CN300-47B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

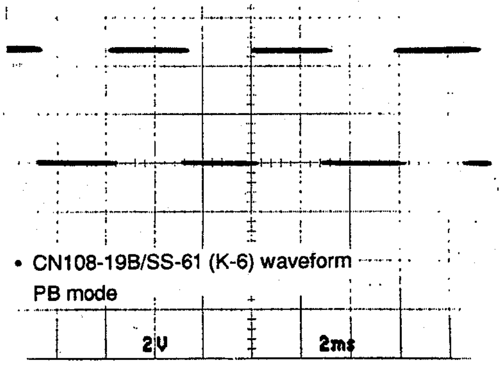
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



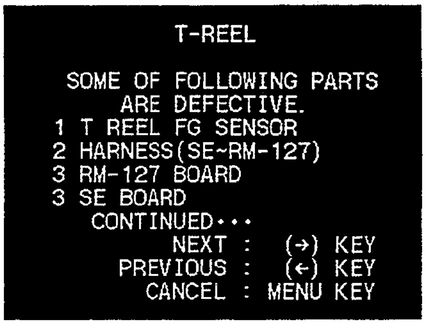
- CN300-47B/DR-214 (H-1) waveform
  PB mode



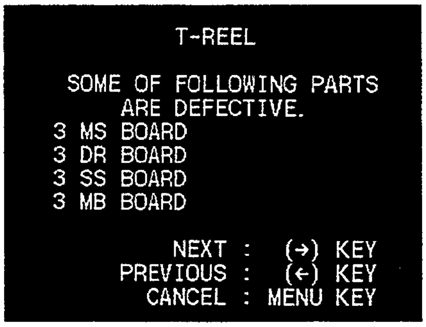
```
            T-REEL

 • CN108-19B/SS
   CHECK THE WAVE FORM
       ON THE POINT.



              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```



- CN108-19B/SS-61 (K-6) waveform
  PB mode



```
            T-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
1 T REEL FG SENSOR
2 HARNESS(SE~RM-127)
3 RM-127 BOARD
3 SE BOARD
   CONTINUED･･･
            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```



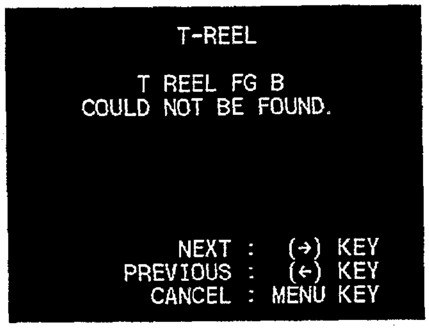
```
            T-REEL

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
3 MS BOARD
3 DR BOARD
3 SS BOARD
3 MB BOARD

            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

Completed

⑤

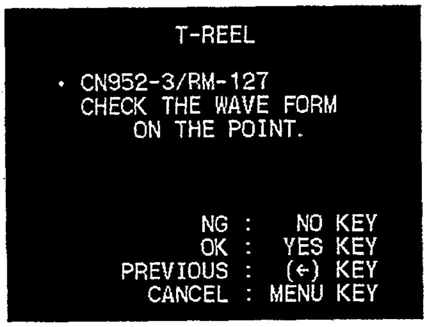
Checks the waveform of the T REEL FG B.



T-REEL

T REEL FG B
COULD NOT BE FOUND.

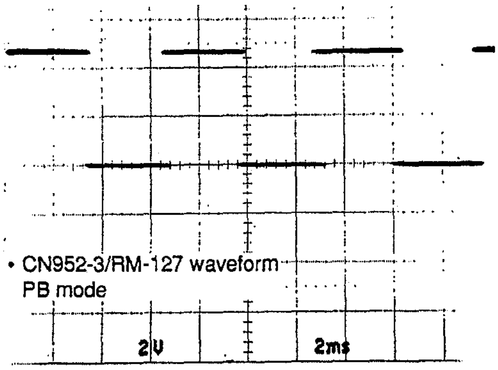
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



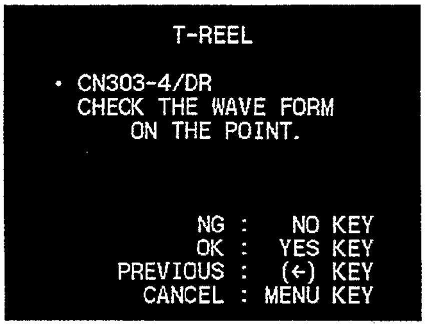
T-REEL

• CN952-3/RM-127
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

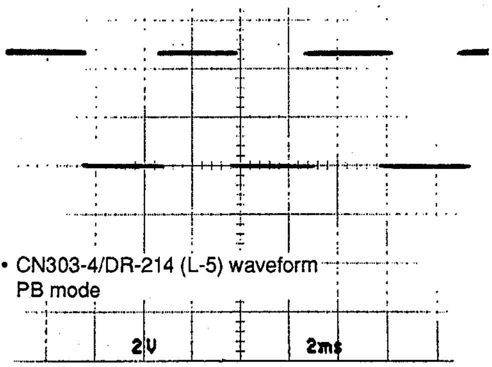


• CN952-3/RM-127 waveform
PB mode

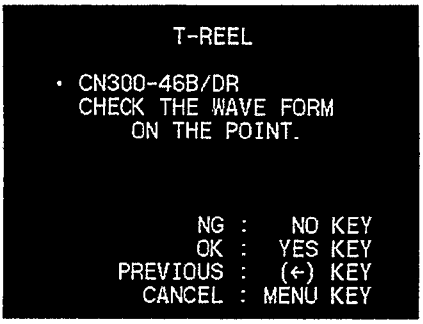

T-REEL

- CN303-4/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

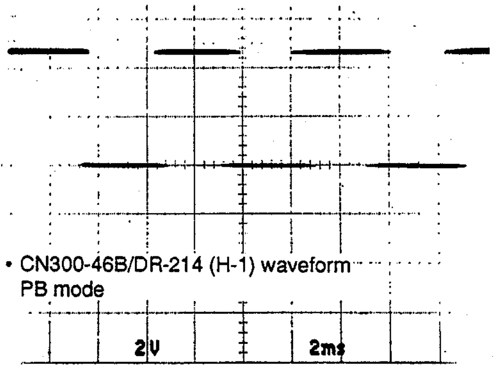


- CN303-4/DR-214 (L-5) waveform
  PB mode


T-REEL

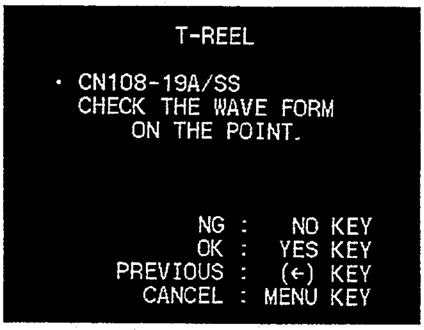
- CN300-46B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



- CN300-46B/DR-214 (H-1) waveform
  PB mode

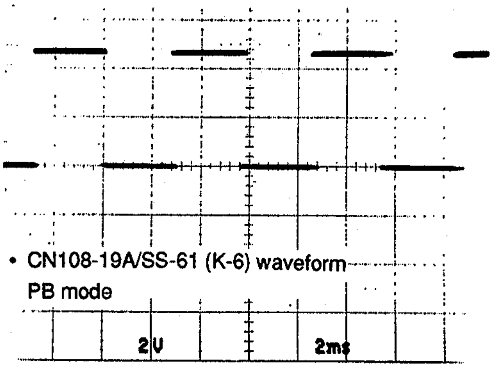
Continues to the next page.



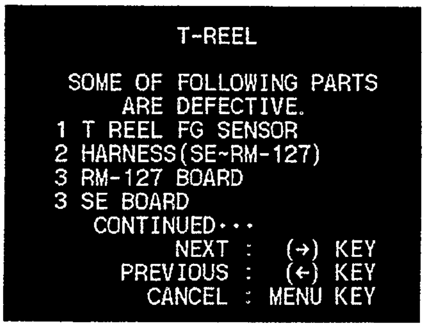
T-REEL

· CN108-19A/SS
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

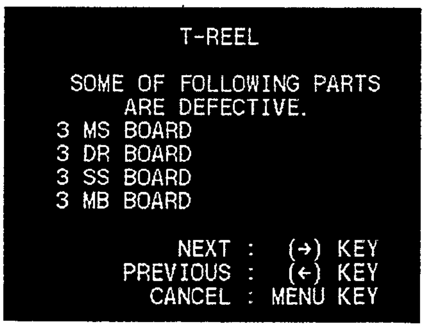


- CN108-19A/SS-61 (K-6) waveform
  PB mode



T-REEL

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 T REEL FG SENSOR
2 HARNESS(SE-RM-127)
3 RM-127 BOARD
3 SE BOARD
CONTINUED···
NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



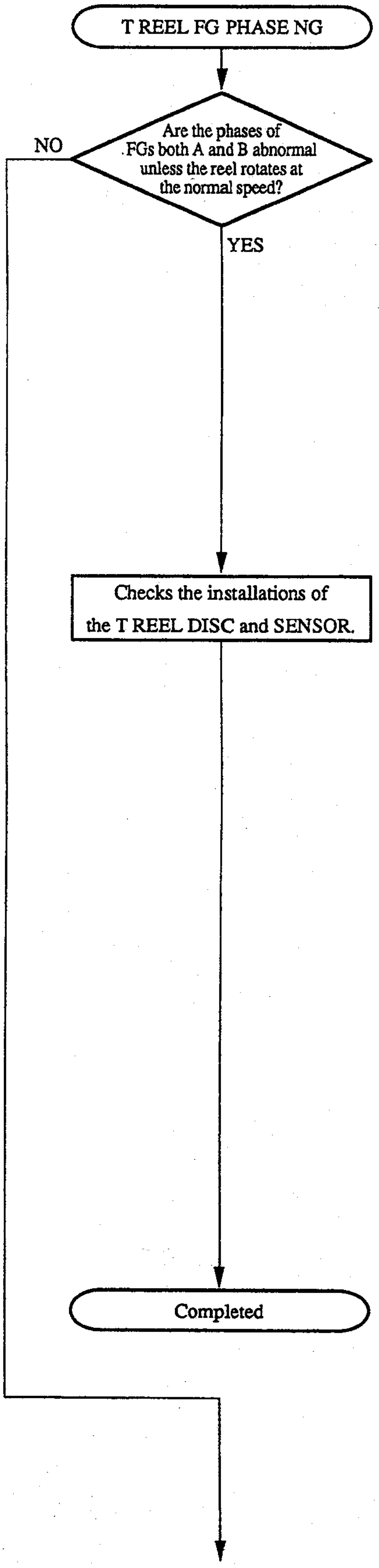
T-REEL

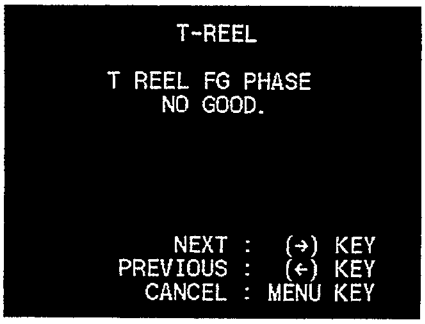
SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
3 MS BOARD
3 DR BOARD
3 SS BOARD
3 MB BOARD

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

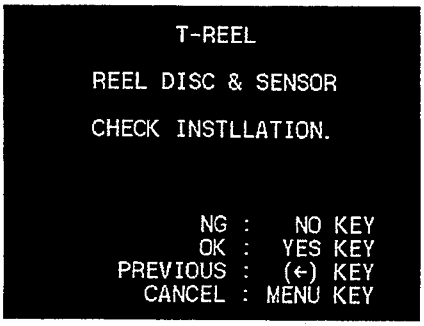
- The probable cause is that any signal is not supplied from the FG sensor or the signal line is shorted to other signal.

Completed


T REEL FG PHASE NG
Are the phases of FGs both A and B abnormal unless the reel rotates at the normal speed?
NO
YES
Checks the installations of the T REEL DISC and SENSOR.
Completed

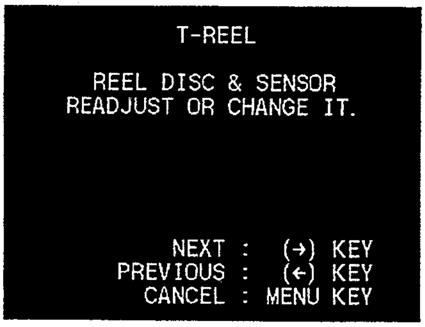


```
              T-REEL

         T REEL FG PHASE
             NO GOOD.



             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL :  MENU KEY
```



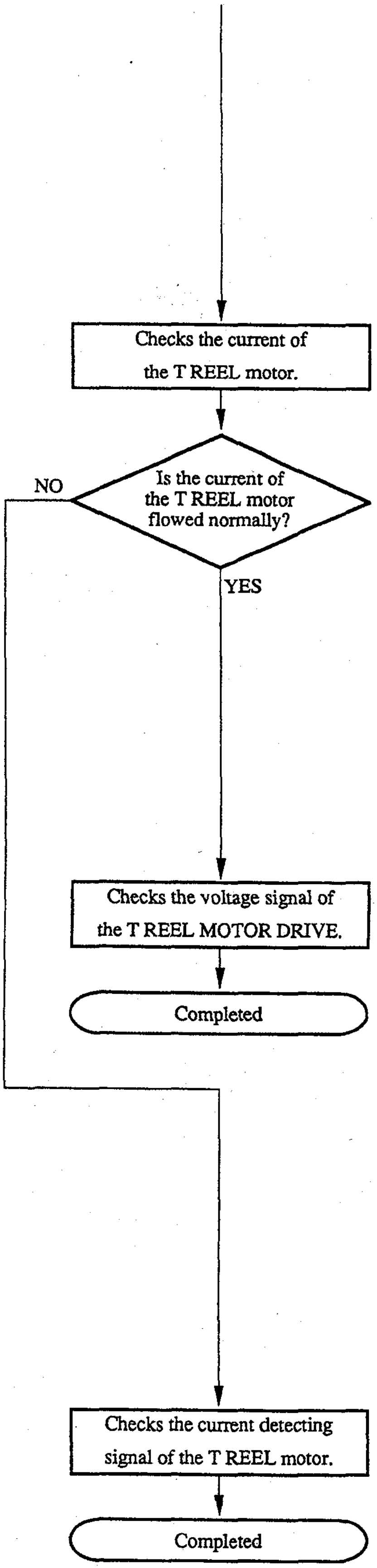
```
              T-REEL

       REEL DISC & SENSOR

       CHECK  INSTLLATION.


               NG :    NO KEY
               OK :   YES KEY
         PREVIOUS :   (←) KEY
           CANCEL :  MENU KEY
```

- Refer to section 6-7 in Service Manual Vol. 1.

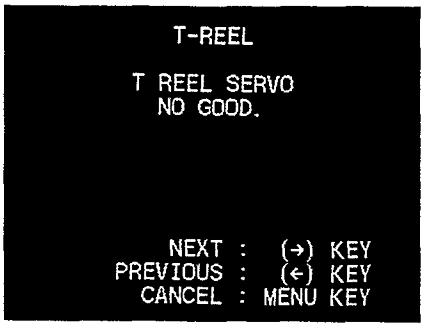


```
              T-REEL

        REEL DISC & SENSOR
      READJUST OR CHANGE IT.



             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL :  MENU KEY
```

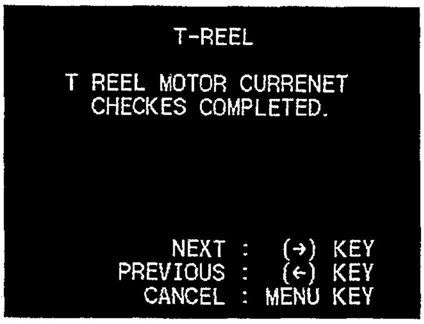
- Refer to section 6-7 in Service Manual Vol. 1.


Checks the current of the T REEL motor.
Is the current of the T REEL motor flowed normally?
NO
YES
Checks the voltage signal of the T REEL MOTOR DRIVE.
Completed
Checks the current detecting signal of the T REEL motor.
Completed

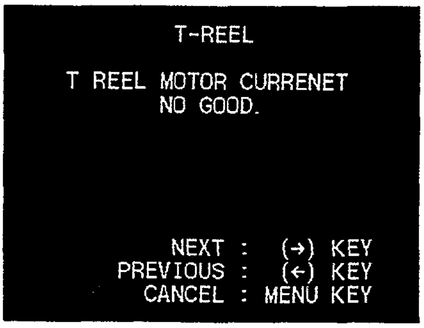
- The unit checks automatically.



```
T-REEL

T REEL SERVO
 NO GOOD.



      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

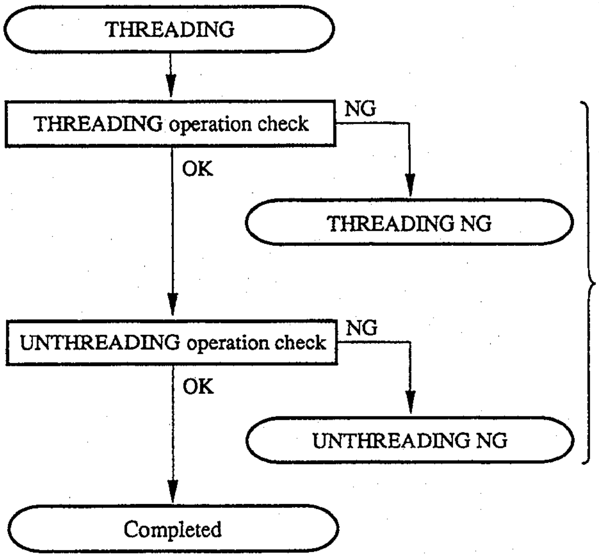


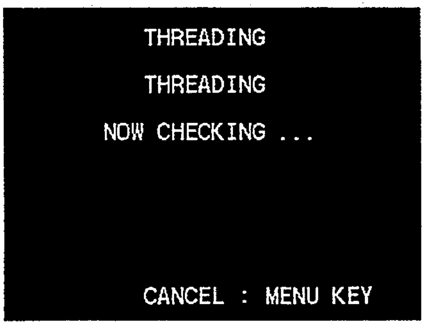
```
T-REEL

T REEL MOTOR CURRENET
 CHECKES COMPLETED.



      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```



```
T-REEL

T REEL MOTOR CURRENET
 NO GOOD.



      NEXT :  (→) KEY
  PREVIOUS :  (←) KEY
    CANCEL : MENU KEY
```

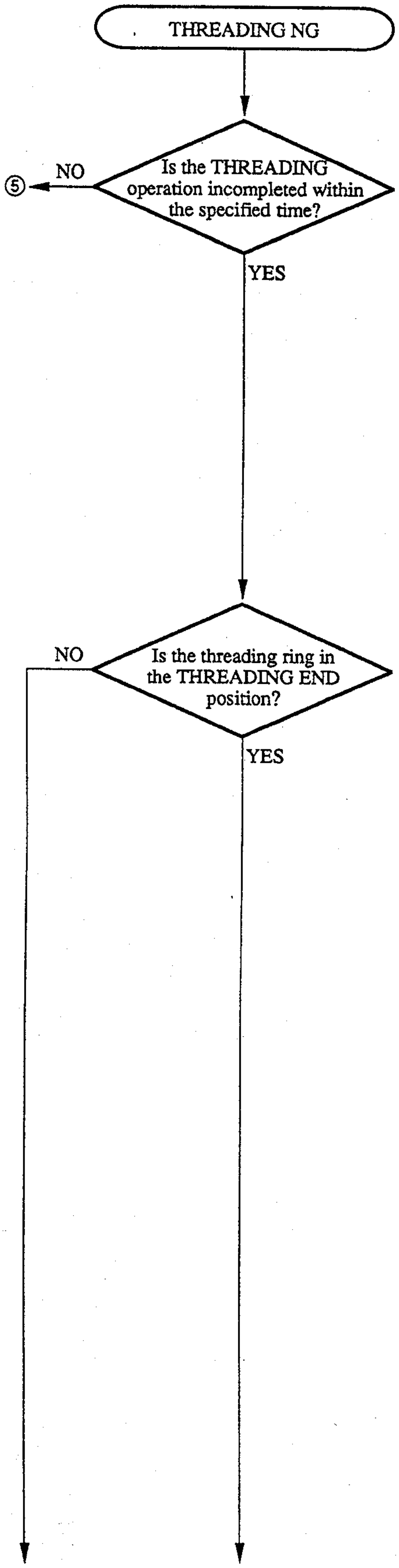
(9) THREADING Diagnosis

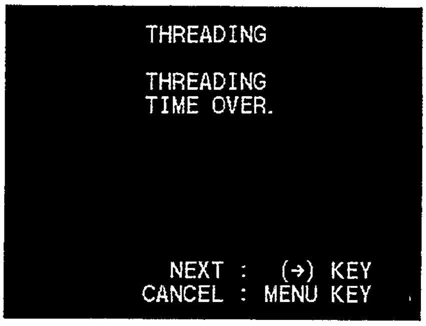

THREADING
THREADING operation check
NG
OK
THREADING NG
UNTHREADING operation check
NG
OK
UNTHREADING NG
Completed



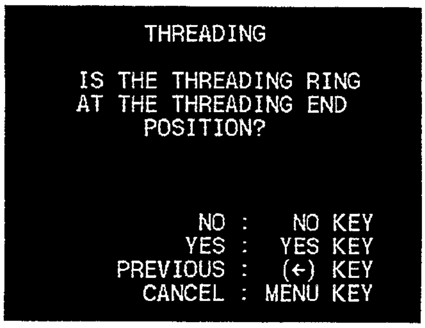
```
THREADING
THREADING
NOW CHECKING ...


CANCEL : MENU KEY
```

- The unit checks automatically.


THREADING NG
Is the THREADING operation incompleted within the specified time?
NO
⑤
YES
Is the threading ring in the THREADING END position?
NO
YES

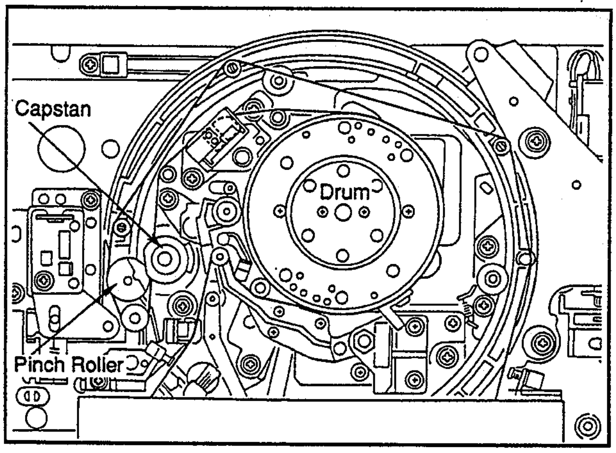


```
THREADING

THREADING
TIME OVER.



       NEXT :   (→) KEY
     CANCEL : MENU KEY
```

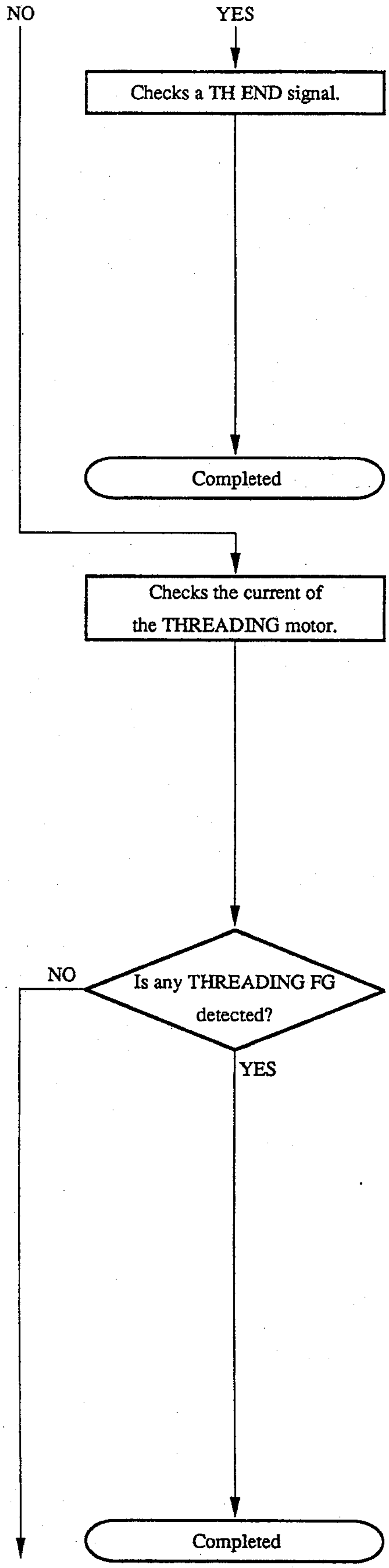


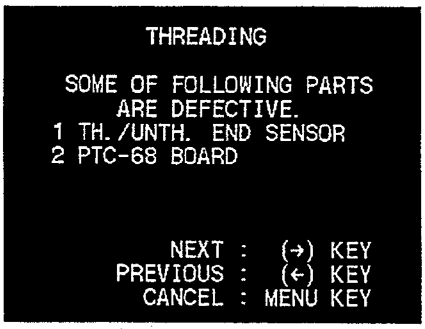
```
          THREADING

    IS THE THREADING RING
    AT THE THREADING END
          POSITION?

              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- Check the position of the threading ring.


Capstan
Drum
Pinch Roller

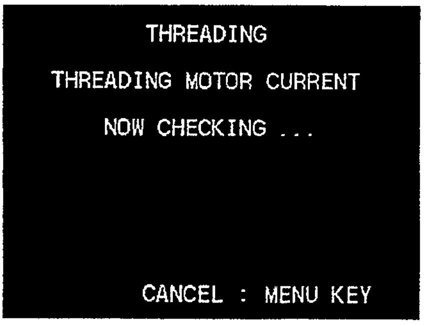
Check : The pinch roller should be against the capstan motor.


NO
YES
Checks a TH END signal.
Completed
Checks the current of the THREADING motor.
NO
Is any THREADING FG detected?
YES
Completed



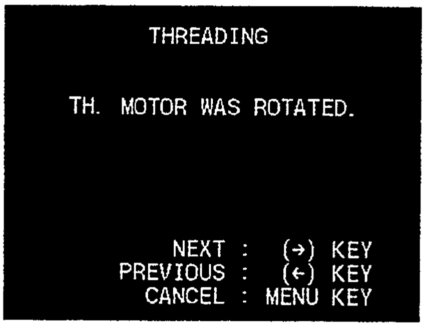
```
THREADING

 SOME OF FOLLOWING PARTS
     ARE DEFECTIVE.
1 TH./UNTH. END SENSOR
2 PTC-68 BOARD


         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- The other cause than the above is that the voltage does not become more than 4 V because the TH END signal is shorted to other signal.

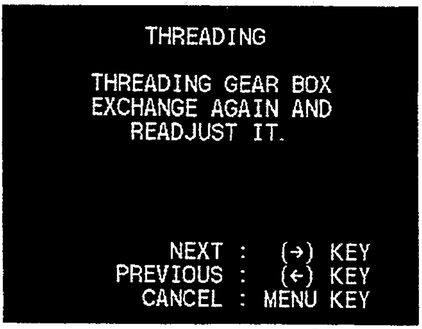


```
THREADING

THREADING MOTOR CURRENT

    NOW CHECKING ...



       CANCEL : MENU KEY
```

- The unit checks automatically.

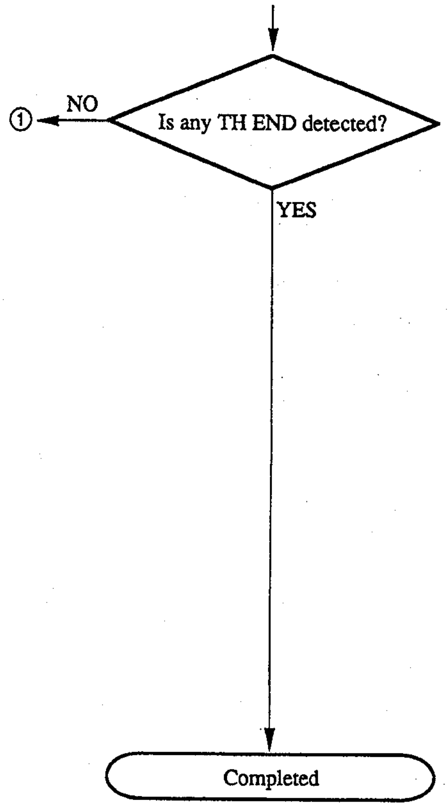


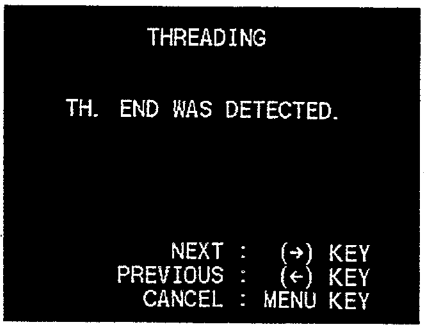
```
THREADING


TH. MOTOR WAS ROTATED.



         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

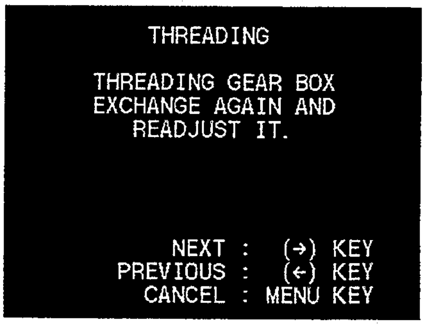


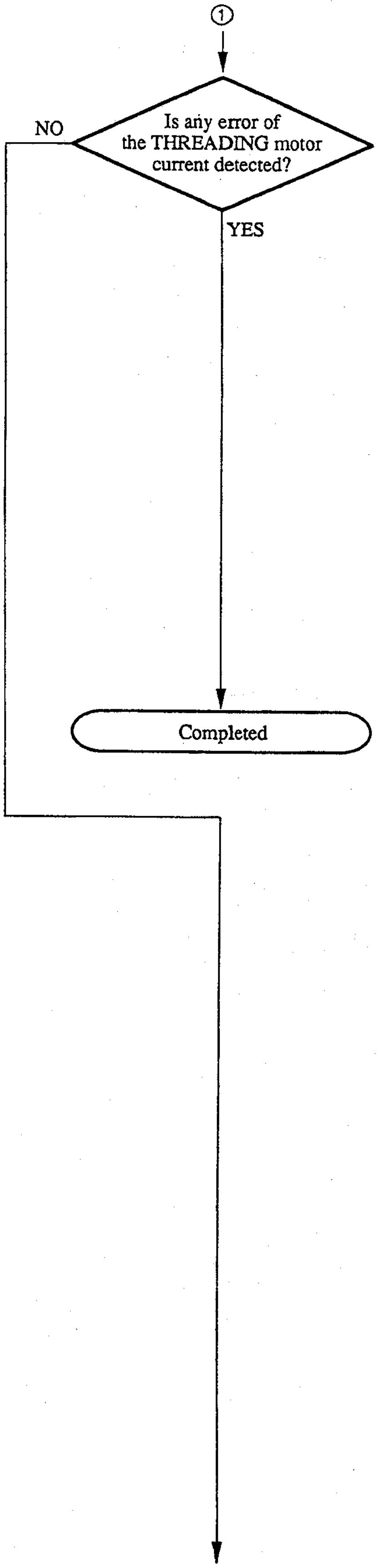
```
THREADING

THREADING GEAR BOX
EXCHANGE AGAIN AND
   READJUST IT.



         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

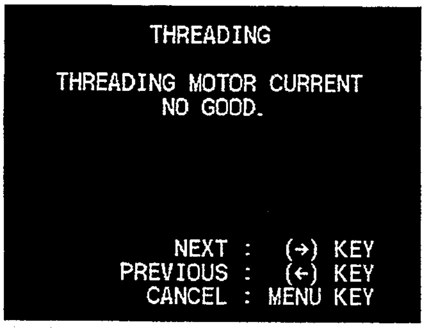
Continues to the next page.


Is any TH END detected?
NO
①
YES
Completed


```
            THREADING

  TH.  END WAS DETECTED.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```


```
            THREADING

     THREADING GEAR BOX
     EXCHANGE AGAIN AND
        READJUST IT.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

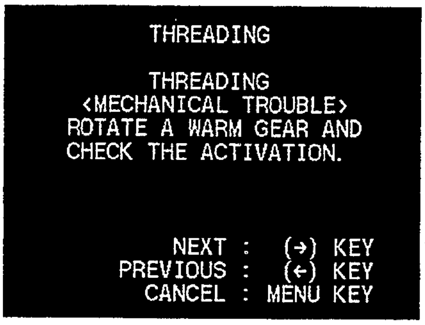

①
NO
Is any error of the THREADING motor current detected?
YES
Completed



THREADING

THREADING MOTOR CURRENT
NO GOOD.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

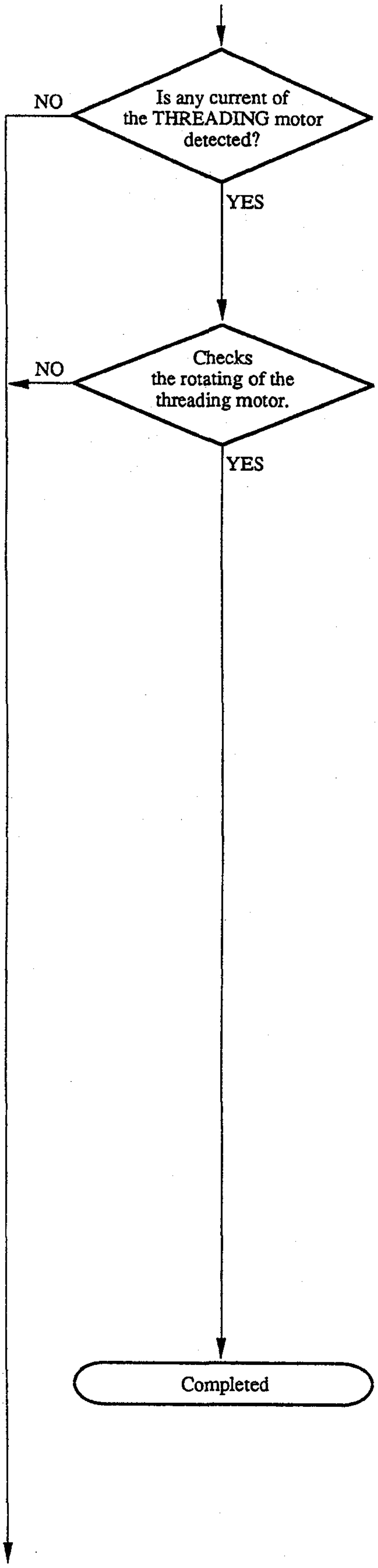


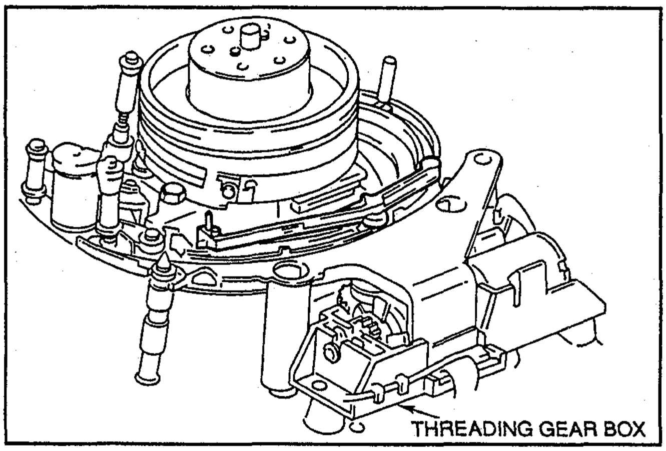
THREADING

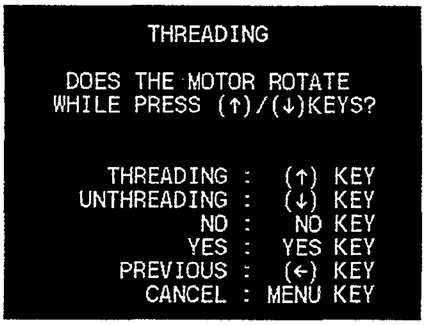
THREADING
<MECHANICAL TROUBLE>
ROTATE A WARM GEAR AND
CHECK THE ACTIVATION.

NEXT : (→) KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

Continues to the next page.

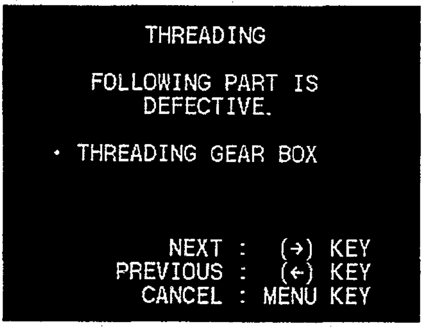

NO
Is any current of the THREADING motor detected?
YES
NO
Checks the rotating of the threading motor.
YES
Completed


THREADING GEAR BOX



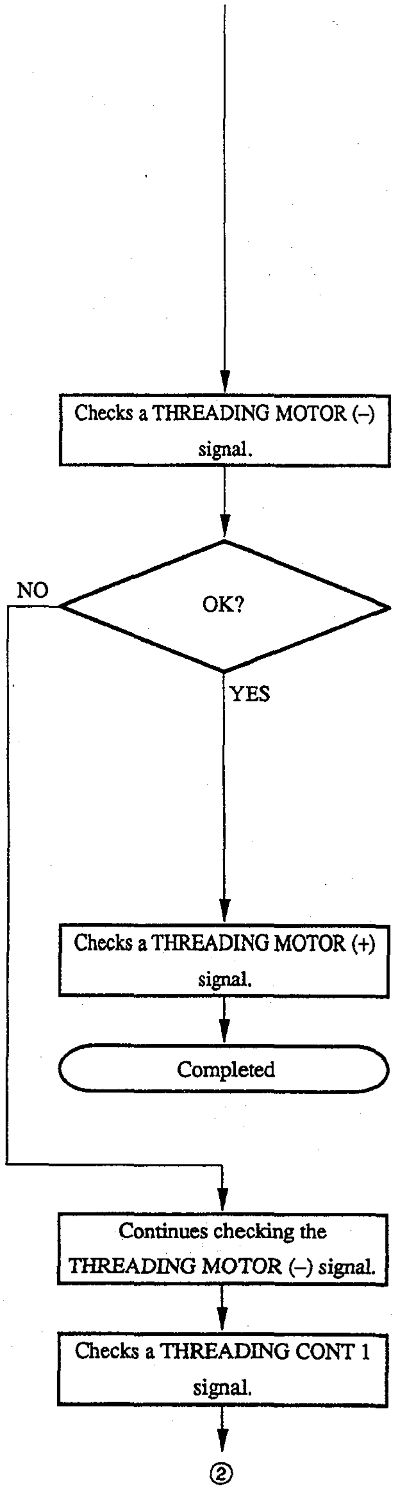
```
            THREADING

      DOES THE MOTOR ROTATE
     WHILE PRESS (↑)/(↓)KEYS?


         THREADING :  (↑) KEY
       UNTHREADING :  (↓) KEY
                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

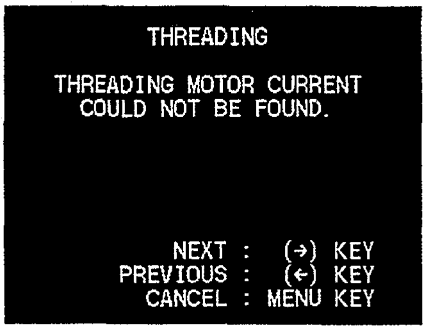
- Check that the threading motor is rotating free or not.



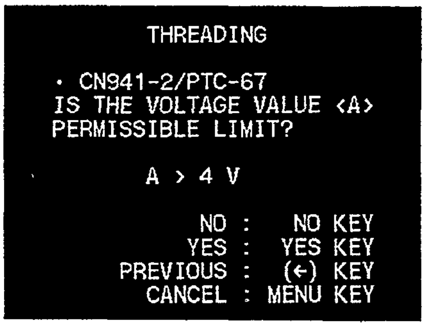
```
            THREADING

        FOLLOWING PART IS
            DEFECTIVE.

     • THREADING GEAR BOX



              NEXT :  (→) KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

- The threading motor is rotating free.

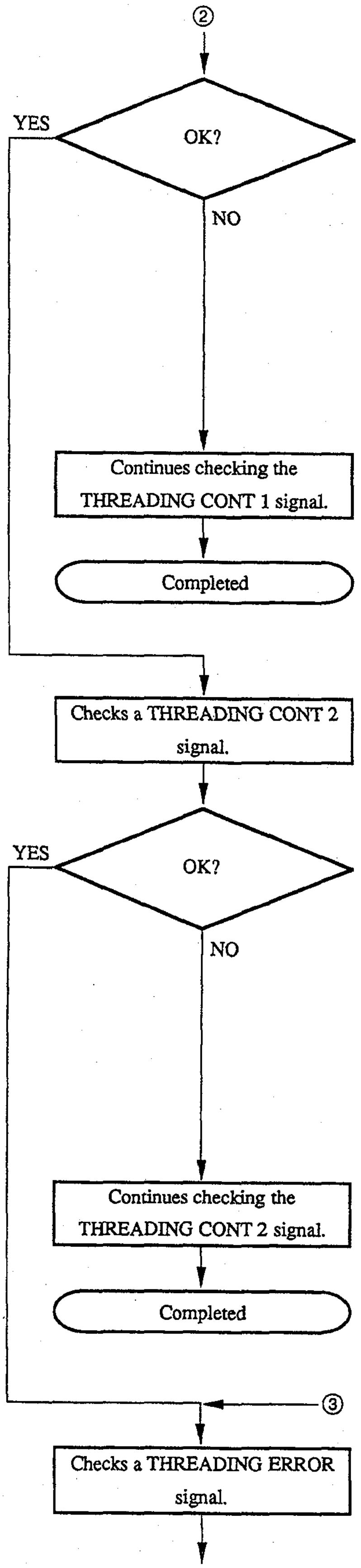

Checks a THREADING MOTOR (–) signal.
OK?
NO
YES
Checks a THREADING MOTOR (+) signal.
Completed
Continues checking the THREADING MOTOR (–) signal.
Checks a THREADING CONT 1 signal.
②

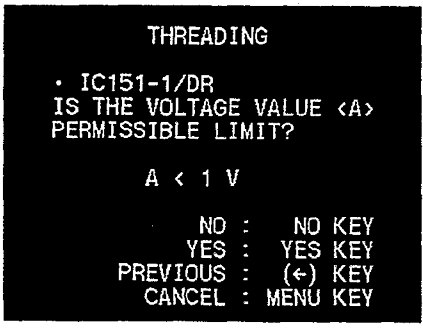


```
        THREADING

THREADING MOTOR CURRENT
  COULD NOT BE FOUND.



        NEXT :  (→) KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```



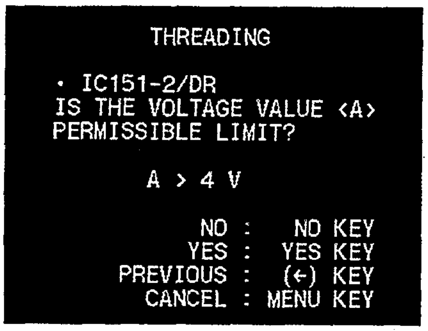
```
        THREADING

• CN941-2/PTC-67
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

        A > 4 V

          NO :   NO KEY
         YES :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```


②
YES
OK?
NO
Continues checking the THREADING CONT 1 signal.
Completed
Checks a THREADING CONT 2 signal.
YES
OK?
NO
Continues checking the THREADING CONT 2 signal.
Completed
③
Checks a THREADING ERROR signal.



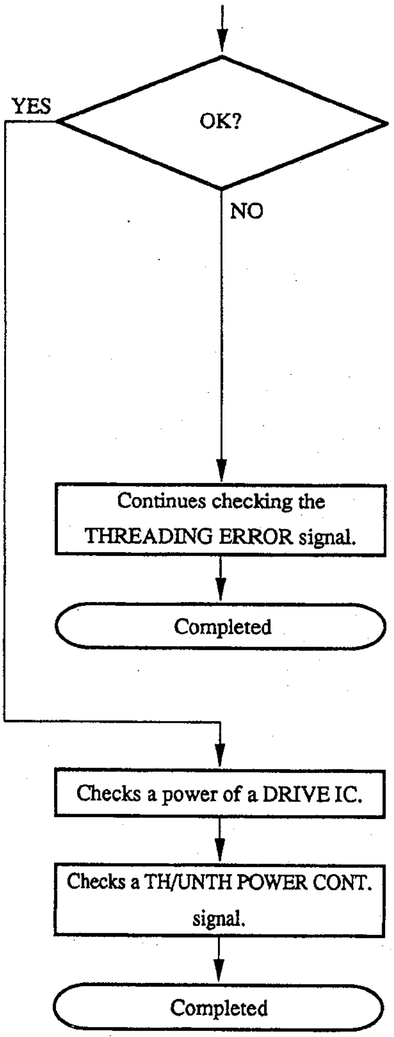
```
            THREADING

   • IC151-1/DR
   IS THE VOLTAGE VALUE <A>
   PERMISSIBLE LIMIT?

           A < 1 V

               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

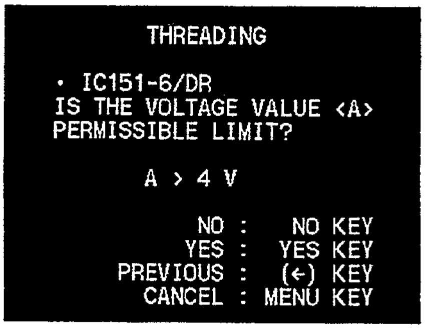
- IC151/DR-214 (L-4)



```
            THREADING

   • IC151-2/DR
   IS THE VOLTAGE VALUE <A>
   PERMISSIBLE LIMIT?

           A > 4 V

               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

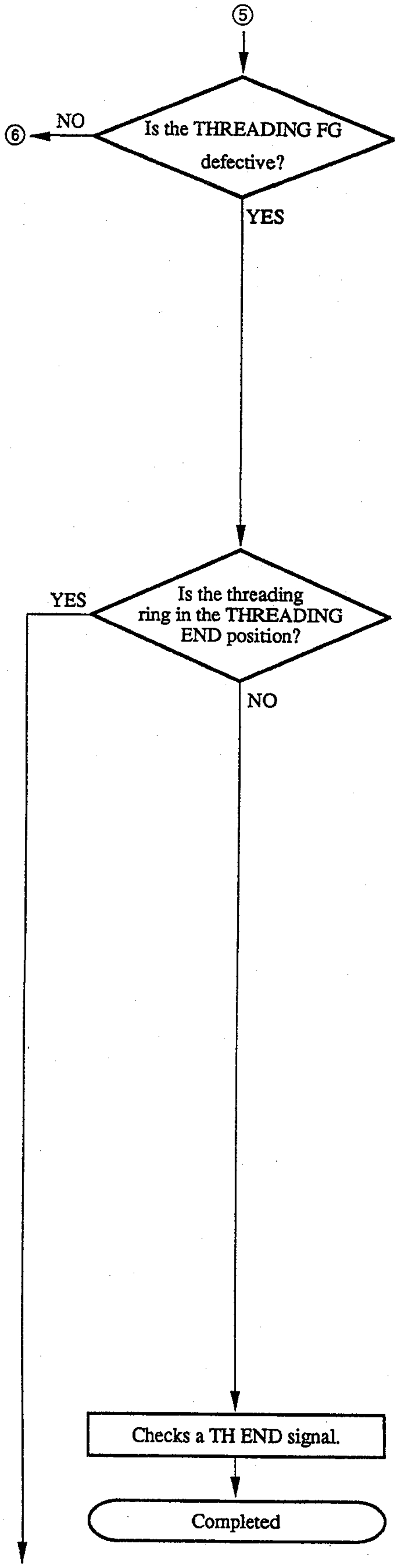
- IC151/DR-214 (L-4)

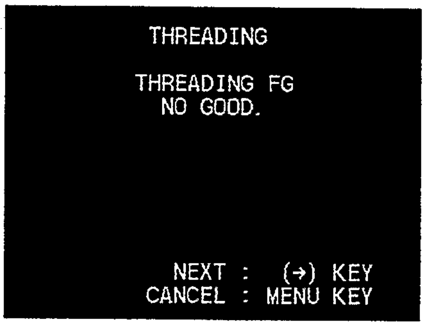

OK?
YES
NO
Continues checking the THREADING ERROR signal.
Completed
Checks a power of a DRIVE IC.
Checks a TH/UNTH POWER CONT. signal.
Completed



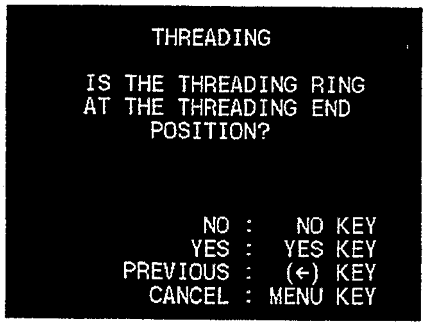
```
              THREADING

     • IC151-6/DR
     IS THE VOLTAGE VALUE <A>
     PERMISSIBLE LIMIT?

           A > 4 V

                 NO :    NO KEY
                YES :   YES KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```

- IC151/DR-214 (L-4)


⑤
Is the THREADING FG defective?
NO
⑥
YES
Is the threading ring in the THREADING END position?
YES
NO
Checks a TH END signal.
Completed

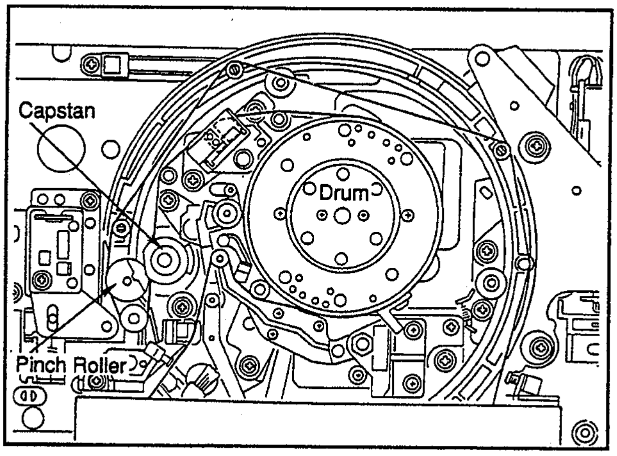


```
THREADING

THREADING FG
 NO GOOD.




   NEXT :   (→) KEY
 CANCEL : MENU KEY
```



```
THREADING

IS THE THREADING RING
AT THE THREADING END
     POSITION?


     NO :   NO KEY
    YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

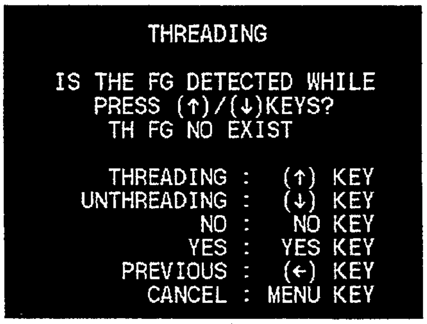
- Check the position of the threading ring.


Capstan
Drum
Pinch Roller

Check : The pinch roller should be against the capstan motor.

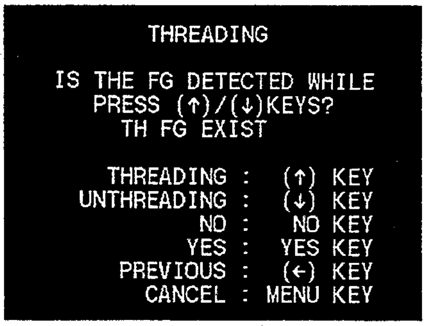
④

Checks a THREADING FG signal.



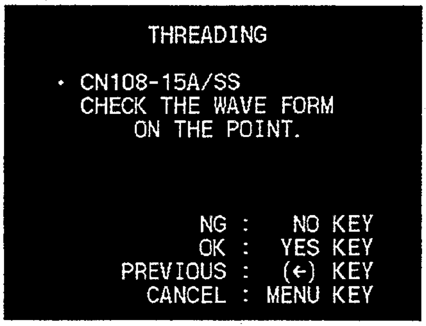
```
          THREADING

IS THE FG DETECTED WHILE
   PRESS (↑)/(↓)KEYS?
    TH FG NO EXIST

    THREADING :  (↑) KEY
  UNTHREADING :  (↓) KEY
           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- If this display is not changed after pressing the (↑) or (↓) key, press the NO key.

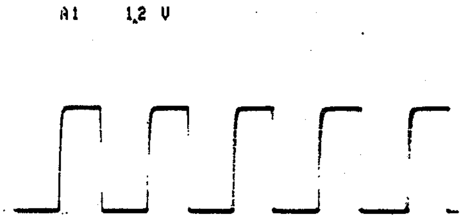


```
          THREADING

IS THE FG DETECTED WHILE
   PRESS (↑)/(↓)KEYS?
     TH FG EXIST

    THREADING :  (↑) KEY
  UNTHREADING :  (↓) KEY
           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- If this display is not changed after pressing the (↑) of (↓) key, press the YES key.

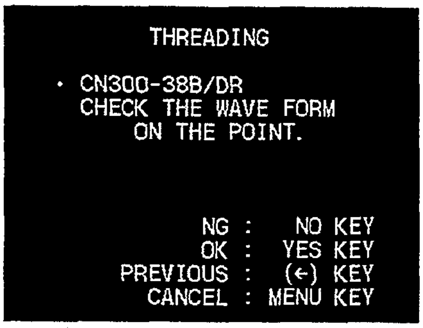


```
          THREADING

 · CN108-15A/SS
   CHECK THE WAVE FORM
       ON THE POINT.



           NG :   NO KEY
           OK :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```



- CN108-15A/SS-61 (K-6) waveform

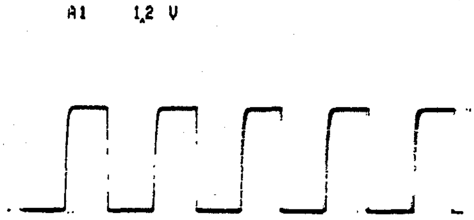
Continues to the next page.



THREADING

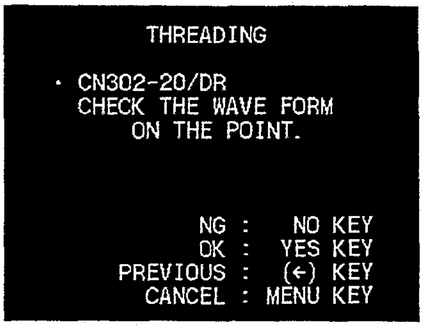
- CN300-38B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



- CN300-38B/DR-214 (H-1) waveform

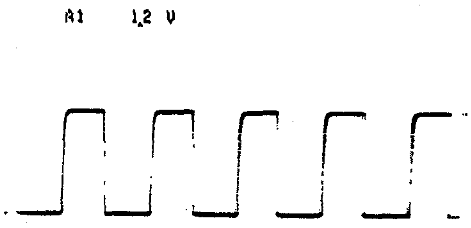
2V 1ms



THREADING

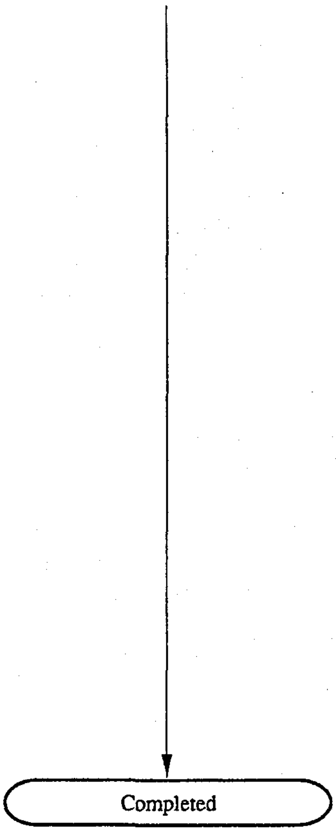
- CN302-20/DR
  CHECK THE WAVE FORM
  ON THE POINT.

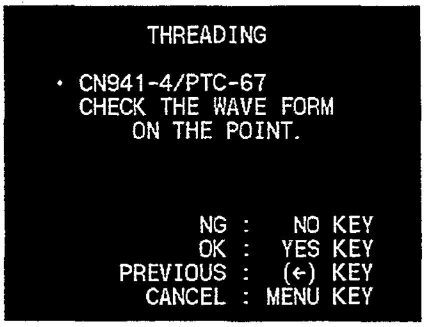
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



- CN302-20/DR-214 (H-5) waveform

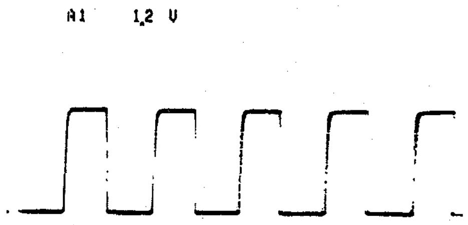
2V 1ms



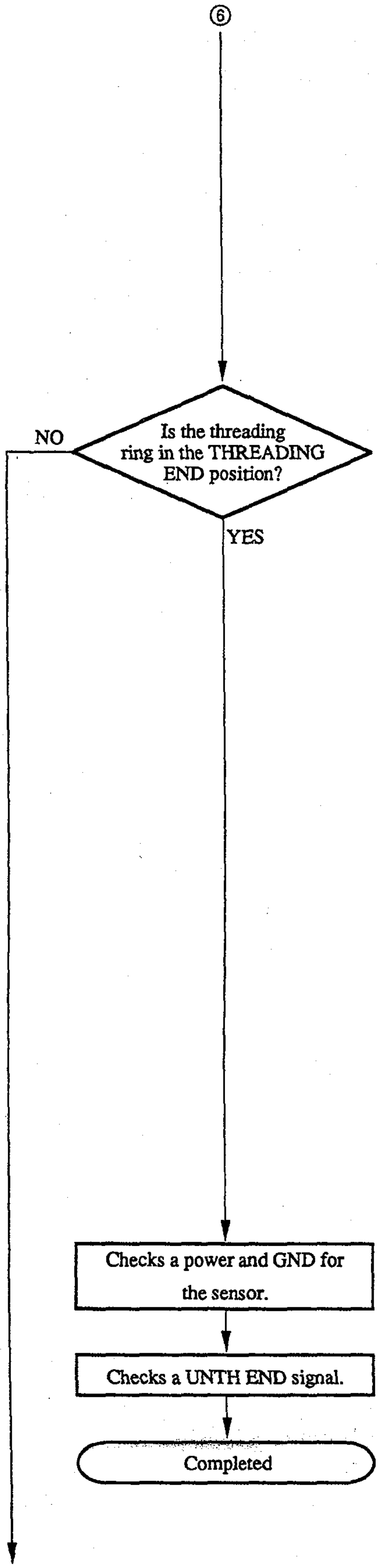

THREADING

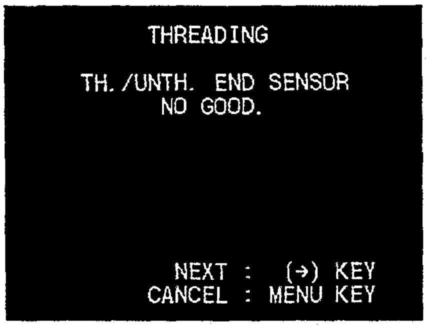
• CN941-4/PTC-67
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

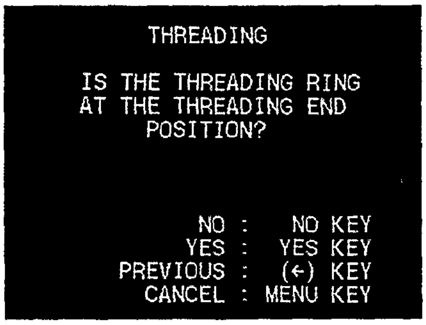


• CN941-4/PTC-67 waveform


⑥
NO
Is the threading ring in the THREADING END position?
YES
Checks a power and GND for the sensor.
Checks a UNTH END signal.
Completed

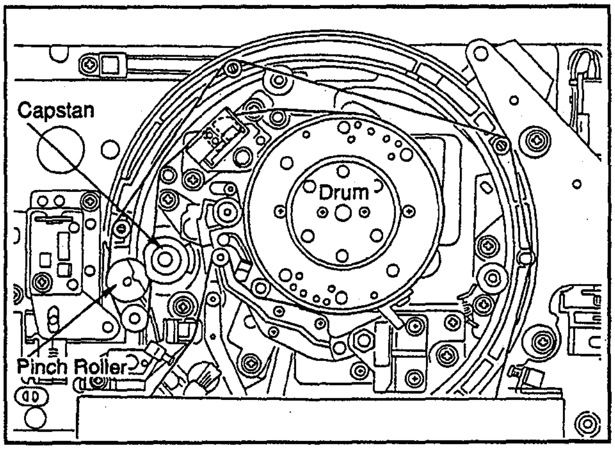


```
              THREADING

        TH./UNTH.  END SENSOR
              NO GOOD.




                    NEXT :   (→) KEY
                  CANCEL : MENU KEY
```

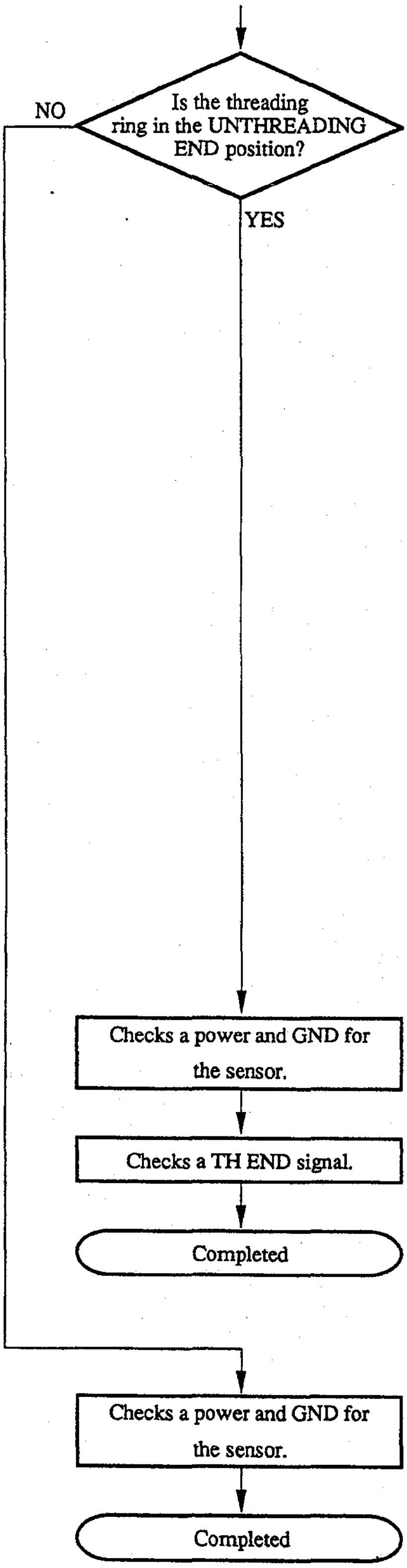


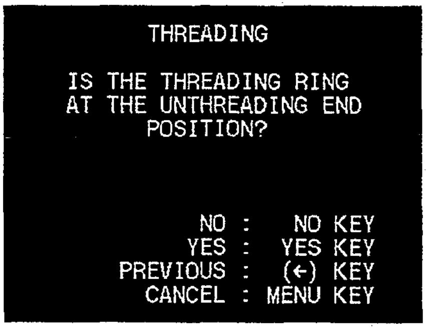
```
              THREADING

        IS THE THREADING RING
        AT THE THREADING END
              POSITION?



                      NO :    NO KEY
                     YES :   YES KEY
                PREVIOUS :   (←) KEY
                  CANCEL : MENU KEY
```

- Check the position of the threading ring.


Capstan
Drum
Pinch Roller

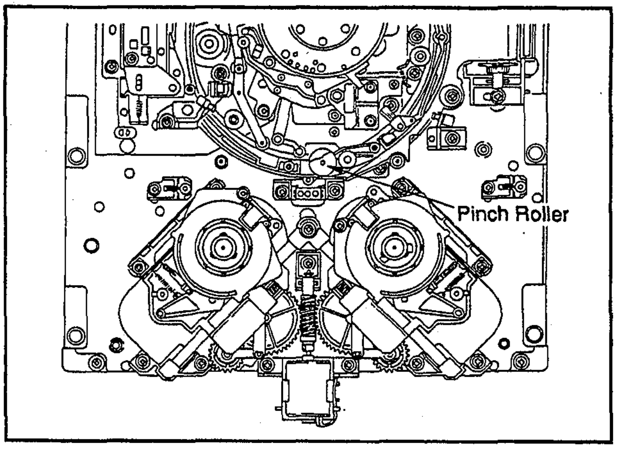
Check : The pinch roller should be against the capstan motor.


NO
Is the threading ring in the UNTHREADING END position?
YES
Checks a power and GND for the sensor.
Checks a TH END signal.
Completed
Checks a power and GND for the sensor.
Completed

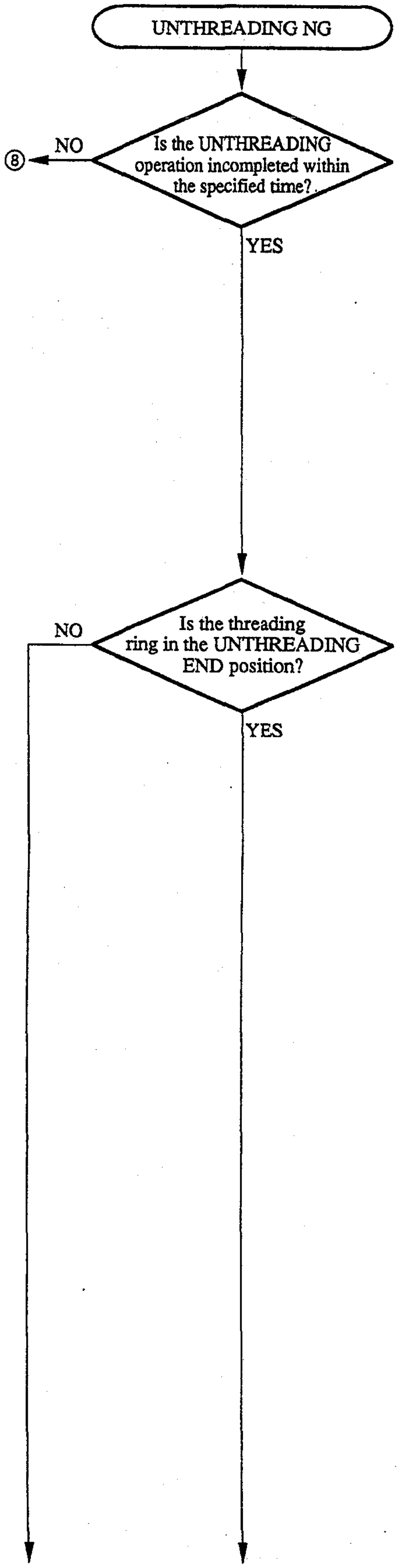


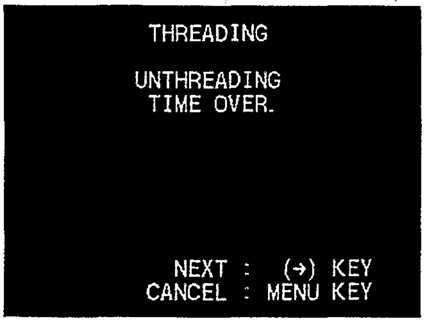
```
            THREADING

    IS THE THREADING RING
    AT THE UNTHREADING END
          POSITION?



               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

- Check the position of the threading ring.

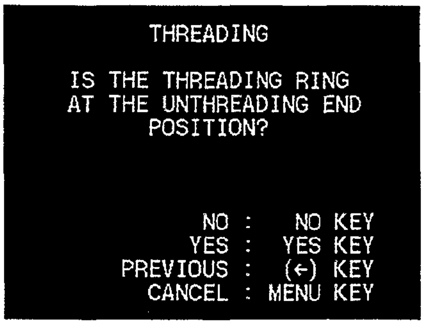

Pinch Roller

Check : The pinch roller should be in the position as shown in the figure.


UNTHREADING NG
Is the UNTHREADING operation incompleted within the specified time?
NO
⑧
YES
Is the threading ring in the UNTHREADING END position?
NO
YES

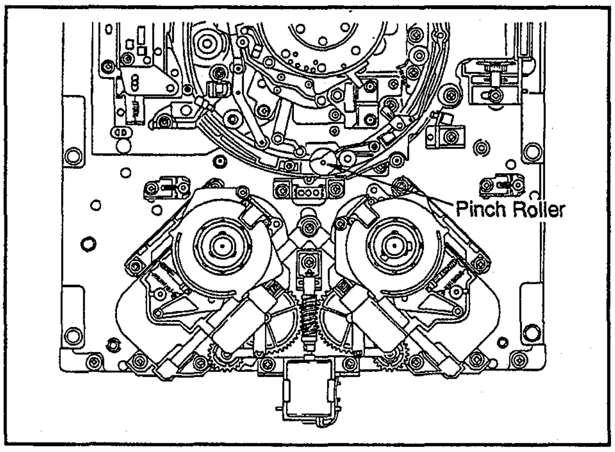


```
THREADING

UNTHREADING
 TIME OVER.

   NEXT :   (→) KEY
 CANCEL : MENU KEY
```

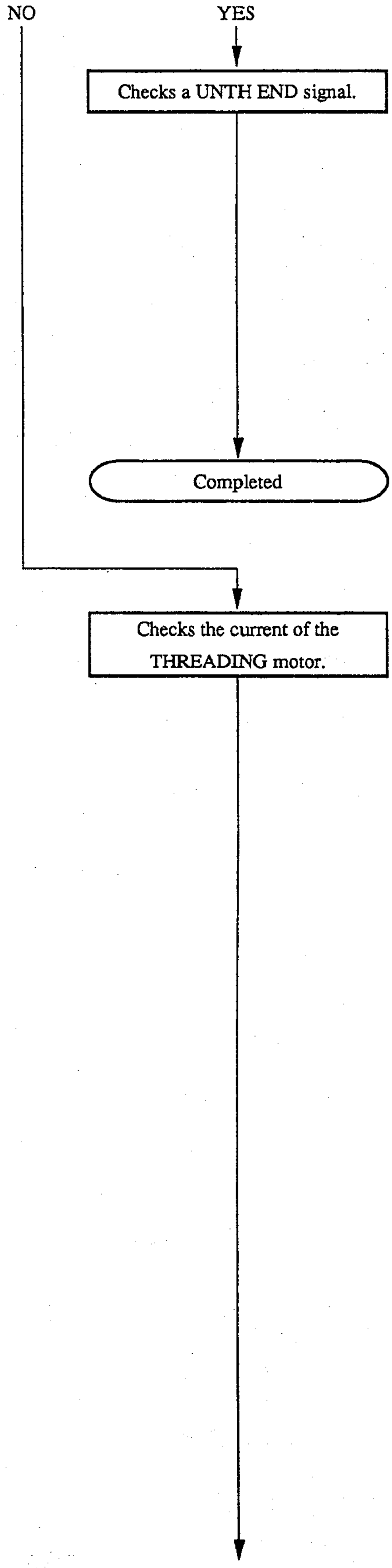


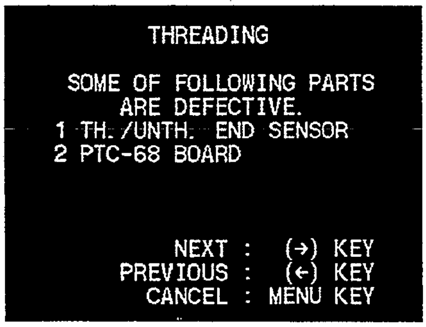
```
THREADING

IS THE THREADING RING
AT THE UNTHREADING END
POSITION?

      NO :   NO KEY
     YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

- Check the position of the threading ring.


Pinch Roller

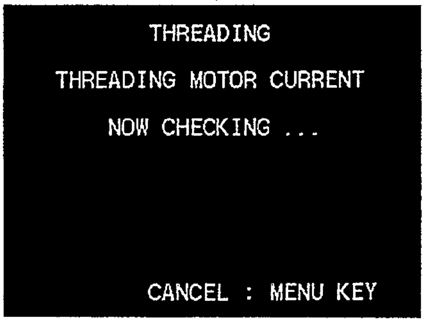
Check : The pinch roller should be in the position as shown in the figure.


NO
YES
Checks a UNTH END signal.
Completed
Checks the current of the THREADING motor.



```
THREADING

 SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 TH./UNTH. END SENSOR
2 PTC-68 BOARD


         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

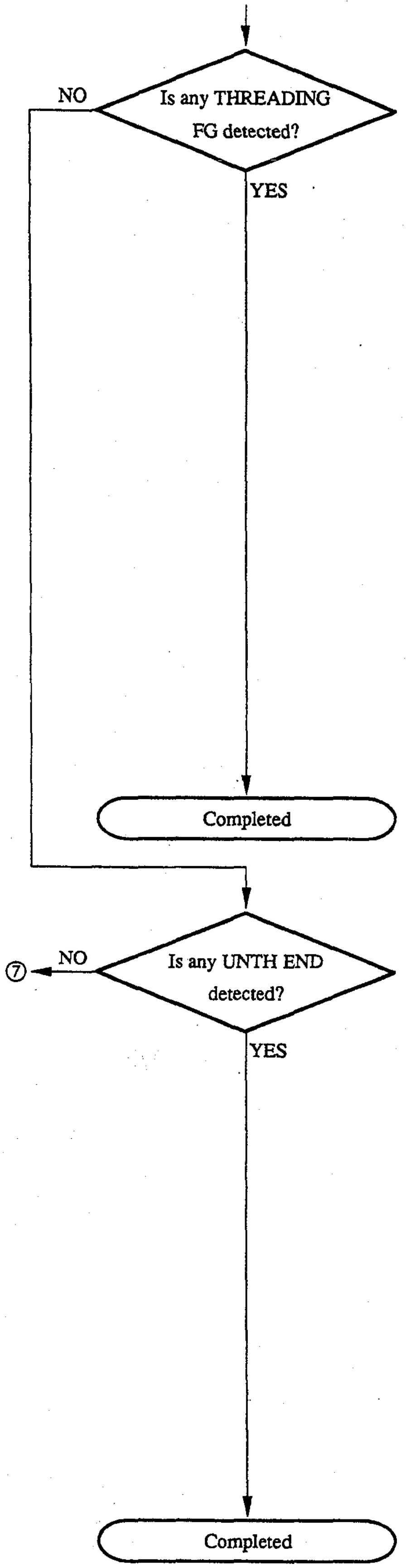
- The other cause than the above is that the voltage does not become more than 4 V because the UNTH END signal is shorted to other signal.

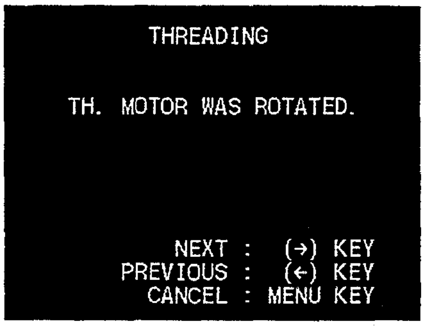


```
THREADING

THREADING MOTOR CURRENT

NOW CHECKING ...




   CANCEL : MENU KEY
```

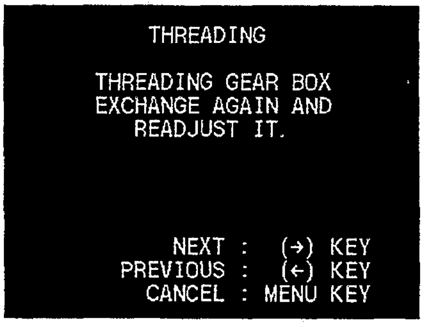
- The unit checks automatically.

Continues to the next page.

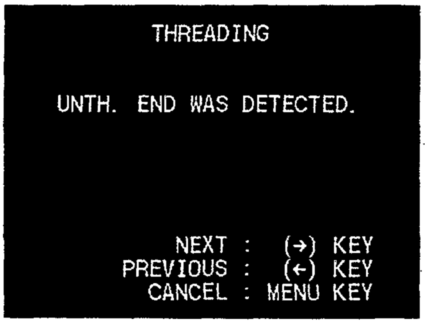

NO
Is any THREADING FG detected?
YES
Completed
⑦
NO
Is any UNTH END detected?
YES
Completed



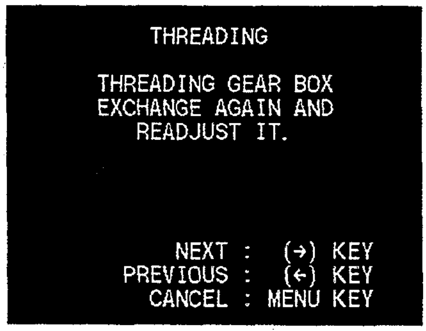
```
THREADING

TH. MOTOR WAS ROTATED.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```



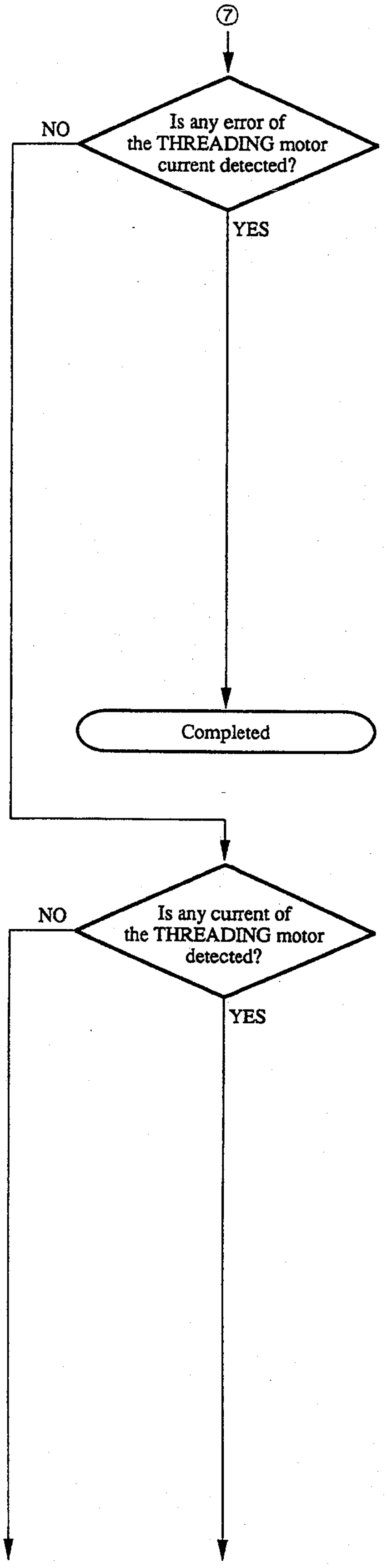
```
THREADING

THREADING GEAR BOX
EXCHANGE AGAIN AND
READJUST IT.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

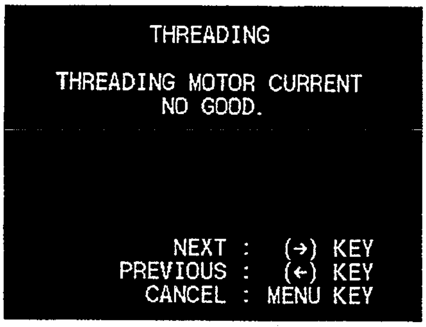


```
THREADING

UNTH. END WAS DETECTED.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

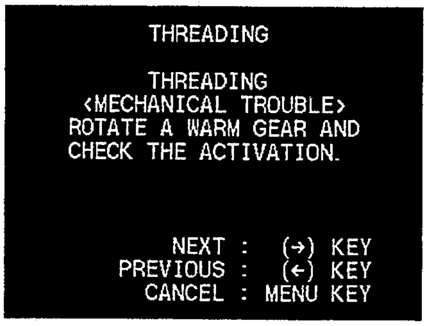


```
THREADING

THREADING GEAR BOX
EXCHANGE AGAIN AND
READJUST IT.



          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

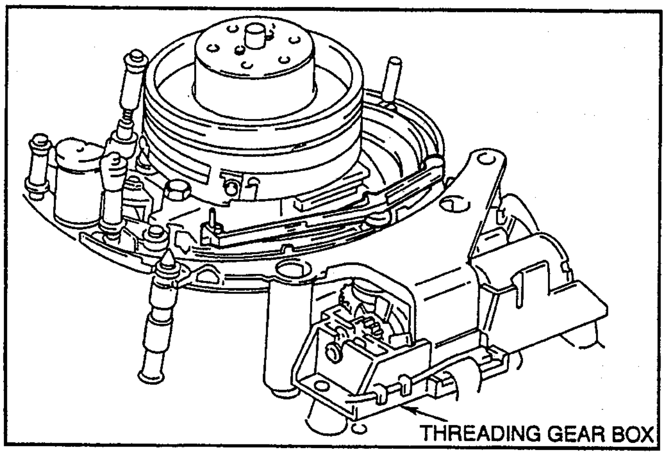

⑦
NO
Is any error of the THREADING motor current detected?
YES
Completed
NO
Is any current of the THREADING motor detected?
YES



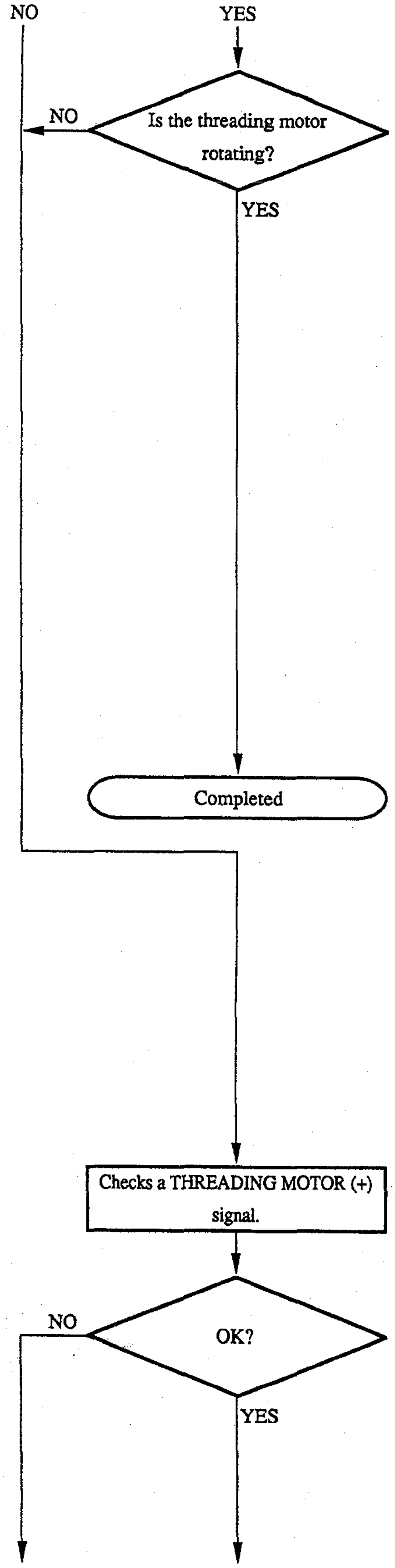
```
       THREADING

THREADING MOTOR CURRENT
        NO GOOD.




        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL : MENU KEY
```

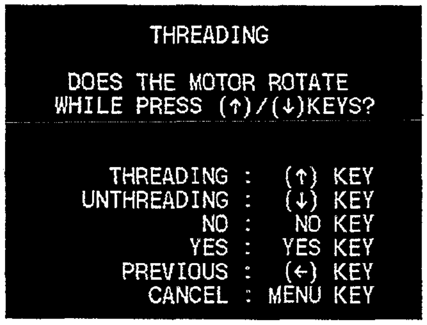


```
       THREADING

       THREADING
  <MECHANICAL TROUBLE>
 ROTATE A WARM GEAR AND
 CHECK THE ACTIVATION.



        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL : MENU KEY
```


THREADING GEAR BOX

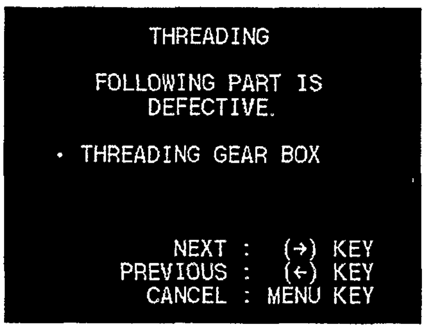
Continues to the next page.


NO
YES
NO
Is the threading motor rotating?
YES
Completed
Checks a THREADING MOTOR (+) signal.
NO
OK?
YES



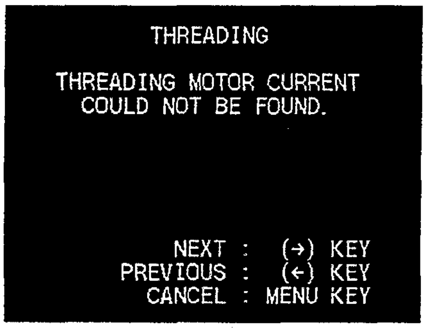
```
              THREADING

        DOES THE MOTOR ROTATE
      WHILE PRESS (↑)/(↓)KEYS?


         THREADING :  (↑) KEY
       UNTHREADING :  (↓) KEY
                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

- Check that the threading motor is rotating free or not.

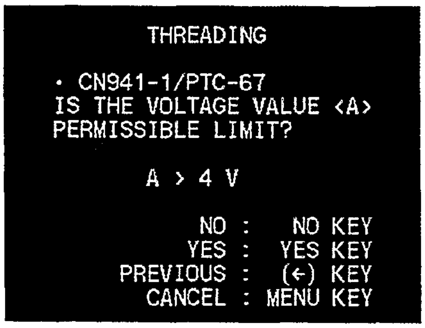


```
              THREADING

         FOLLOWING PART IS
             DEFECTIVE.

      · THREADING GEAR BOX



              NEXT :  (→) KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

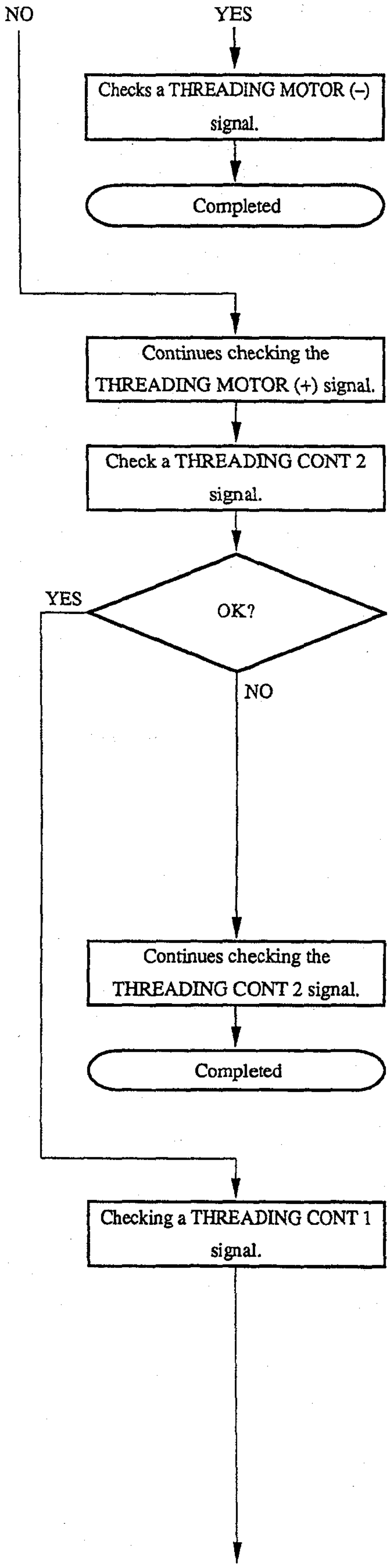
- The threading motor is rotating free.

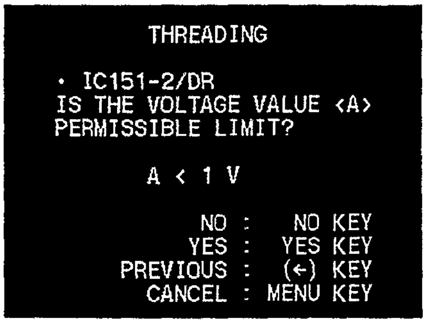


```
              THREADING

      THREADING MOTOR CURRENT
        COULD NOT BE FOUND.




              NEXT :  (→) KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```



```
              THREADING

      · CN941-1/PTC-67
      IS THE VOLTAGE VALUE <A>
      PERMISSIBLE LIMIT?

             A > 4 V

                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

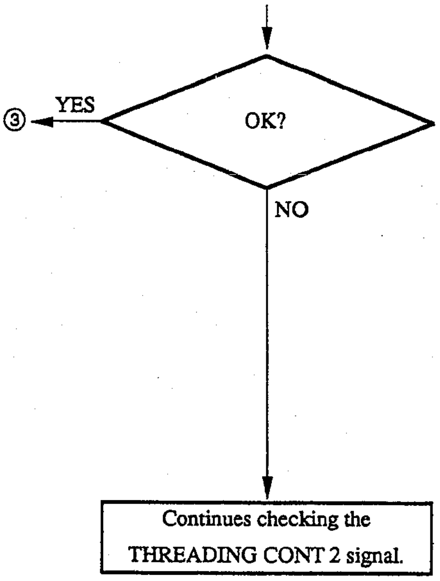

NO
YES
Checks a THREADING MOTOR (–) signal.
Completed
Continues checking the THREADING MOTOR (+) signal.
Check a THREADING CONT 2 signal.
YES
OK?
NO
Continues checking the THREADING CONT 2 signal.
Completed
Checking a THREADING CONT 1 signal.

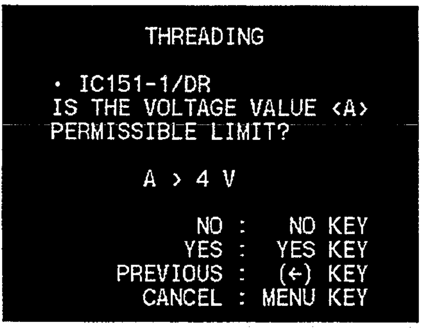


```
              THREADING

      • IC151-2/DR
      IS THE VOLTAGE VALUE <A>
      PERMISSIBLE LIMIT?

              A < 1 V

                  NO :   NO KEY
                 YES :  YES KEY
            PREVIOUS :  (←) KEY
              CANCEL : MENU KEY
```

- IC151/DR-214 (L-4)

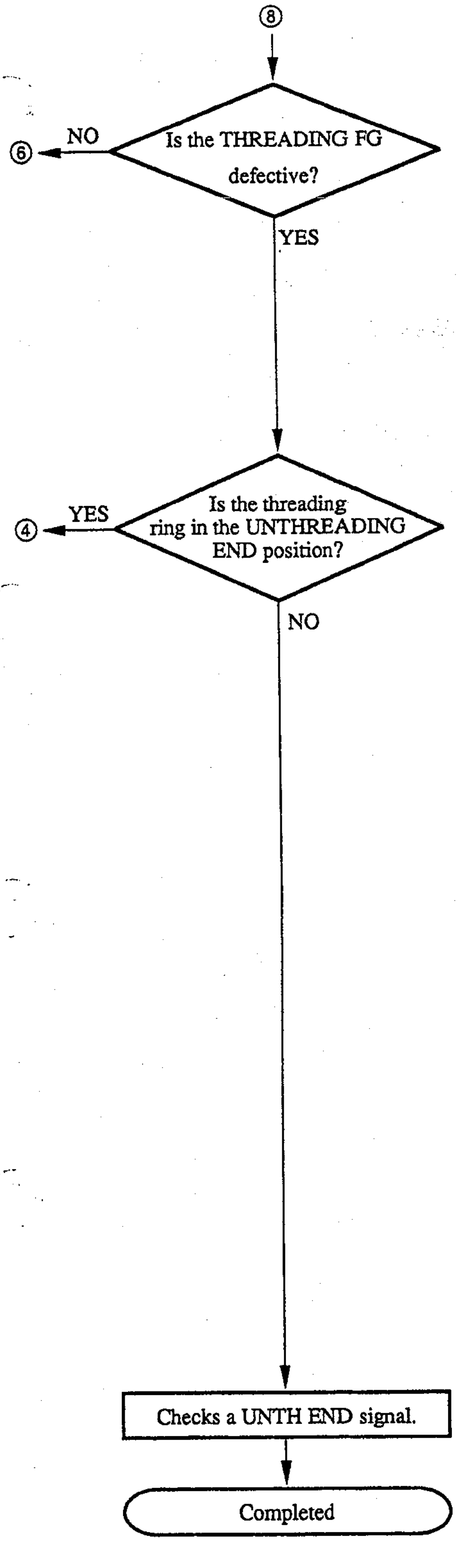
Continues to the next page.

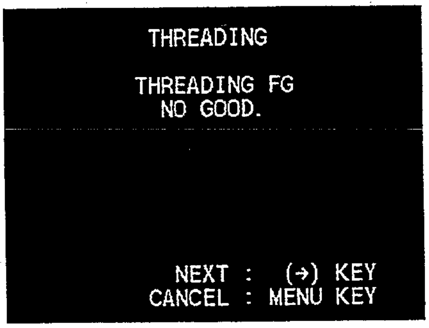

YES
③
OK?
NO
Continues checking the THREADING CONT 2 signal.



```
             THREADING

   • IC151-1/DR
   IS THE VOLTAGE VALUE <A>
   PERMISSIBLE LIMIT?

          A > 4 V

               NO :   NO KEY
              YES :  YES KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

- IC151/DR-214 (L-4)

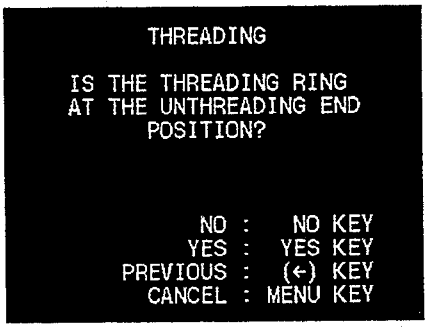

⑧
Is the THREADING FG defective?
NO
⑥
YES
Is the threading ring in the UNTHREADING END position?
YES
④
NO
Checks a UNTH END signal.
Completed



THREADING

THREADING FG
NO GOOD.

NEXT : (→) KEY
CANCEL : MENU KEY

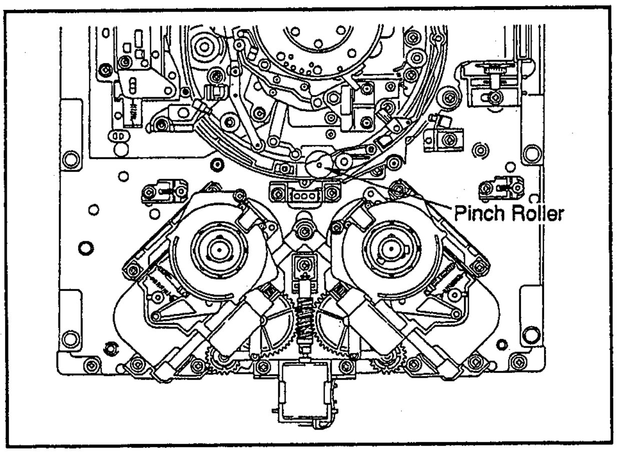


THREADING

IS THE THREADING RING
AT THE UNTHREADING END
POSITION?

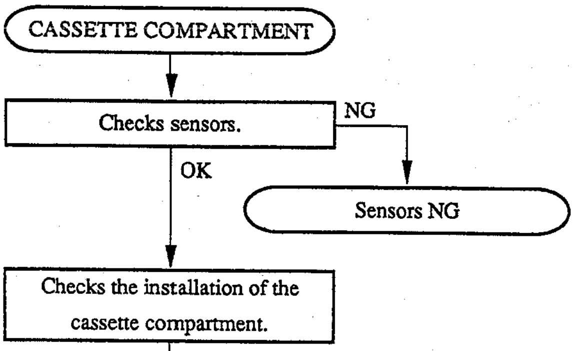
NO : NO KEY
YES : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

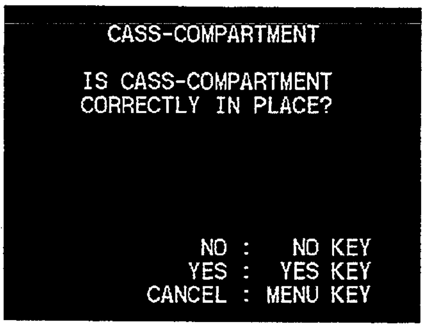
- Check the position of the threading ring.


Pinch Roller

Check : The pinch roller should be in the position as shown in the figure.

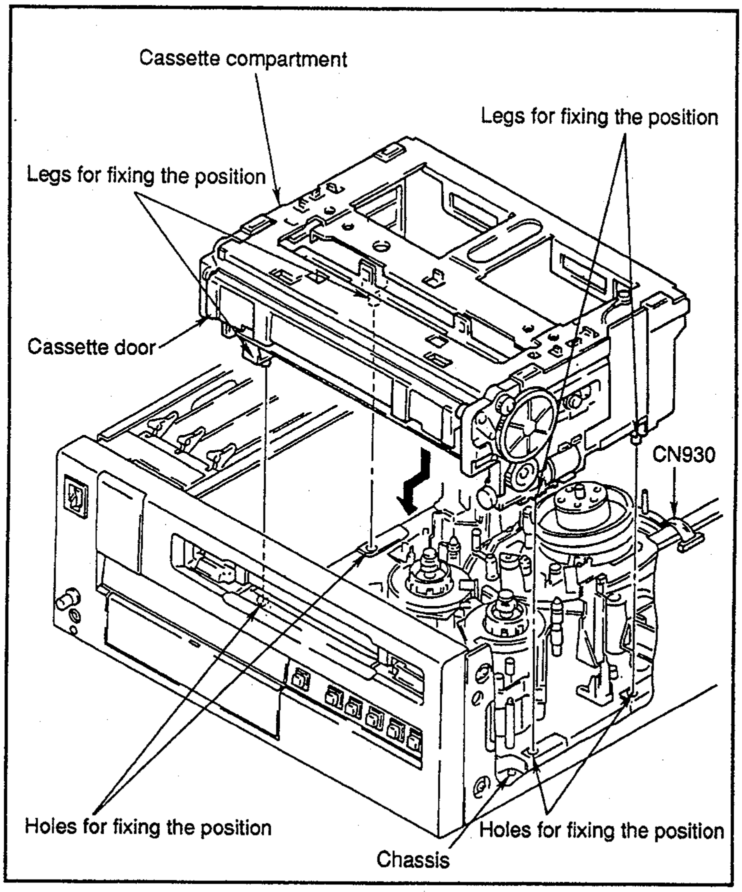
(10) CASSETTE COMPARTMENT Diagnosis


CASSETTE COMPARTMENT
Checks sensors.
NG
OK
Sensors NG
Checks the installation of the cassette compartment.



```
CASS-COMPARTMENT

IS CASS-COMPARTMENT
CORRECTLY IN PLACE?

       NO :   NO KEY
      YES :  YES KEY
   CANCEL : MENU KEY
```

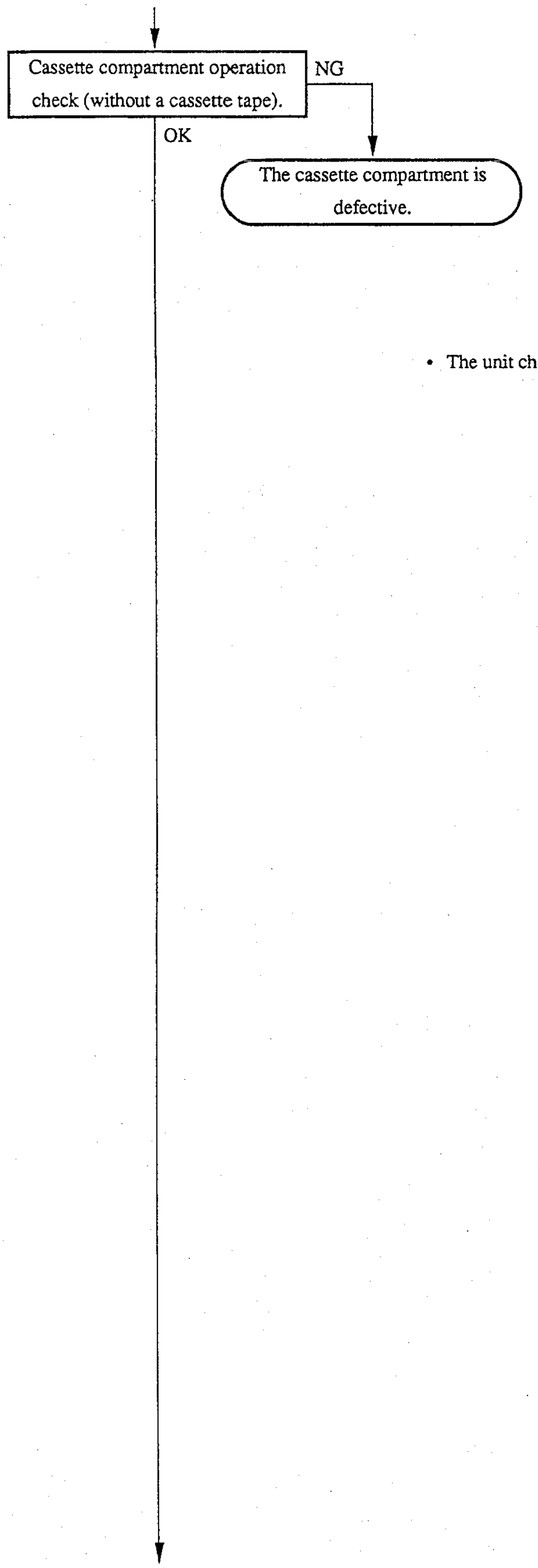
- Installation of the cassette compartment

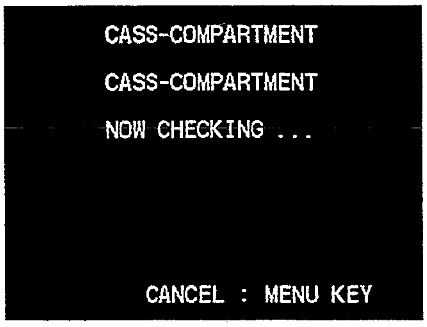

Cassette compartment
Legs for fixing the position
Legs for fixing the position
Cassette door
CN930
Holes for fixing the position
Chassis
Holes for fixing the position

- Set the harnesses of the connector (CN930) so that it is not put between the chassis.
  Install the cassette compartment.

  Note : At this time, confirm that the four legs of the cassette compartment for fixing the position are the holes of the chassis for fixing the position.

- After confirming that the cassette compartment is fixed to the chassis, install the cassette compartment stay and connect the connector (CN930) on the CL-29 board.


Cassette compartment operation check (without a cassette tape).
NG
OK
The cassette compartment is defective.



```
CASS-COMPARTMENT
CASS-COMPARTMENT
NOW CHECKING ...

CANCEL : MENU KEY
```

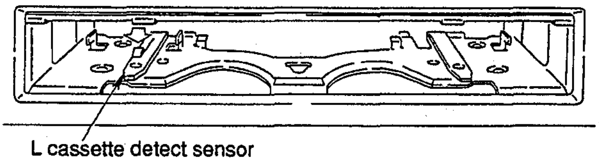
- The unit checks automatically.

Continues to the next page.

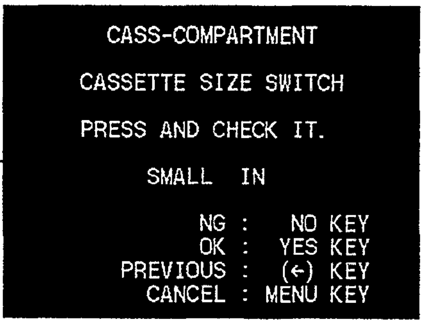
Checks a L cassette detect sensor.

- Check the operation of the L cassette detect sensor as a preparation to insert a cassette tape.

*Lift up the cassette window by hand.



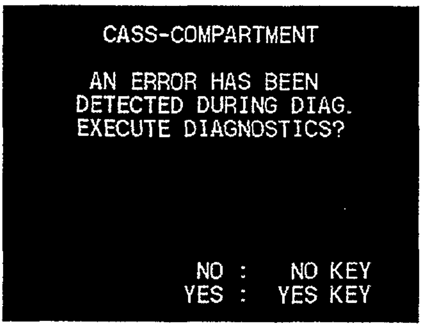
NG



```
CASS-COMPARTMENT

CASSETTE SIZE SWITCH

PRESS AND CHECK IT.

SMALL  IN

       NG :   NO KEY
       OK :  YES KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

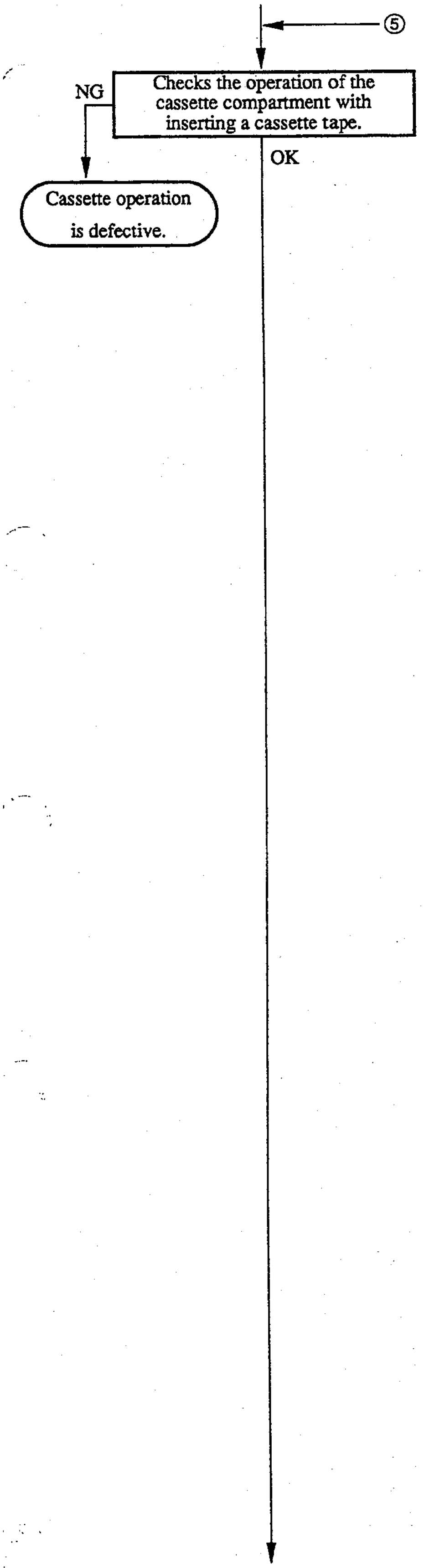
<How to decide>

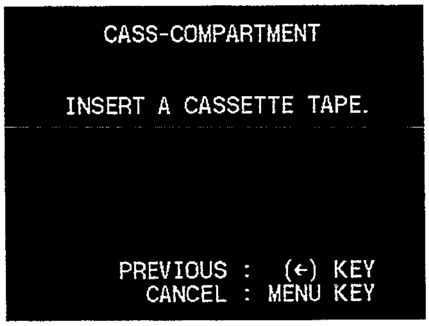
	Not pressing by hand	Pressing by hand	Decision
Display	S CASSETTE	L CASSETTE	OK
	S CASSETTE	S CASSETTE	NG
	L CASSETTE	–	NG



```
CASS-COMPARTMENT

AN ERROR HAS BEEN
DETECTED DURING DIAG.
EXECUTE DIAGNOSTICS?



       NO :   NO KEY
      YES :  YES KEY
```

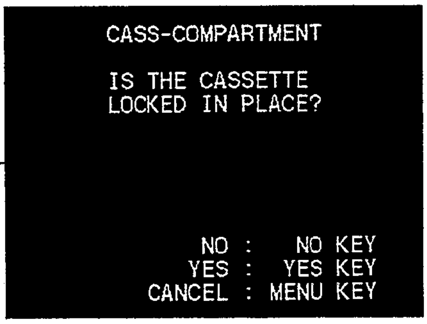
- The sensor is defective.
  When diagnosing the sensor, press the YES key and enter the diagnosis of the sensor.


⑤
Checks the operation of the cassette compartment with inserting a cassette tape.
NG
OK
Cassette operation is defective.



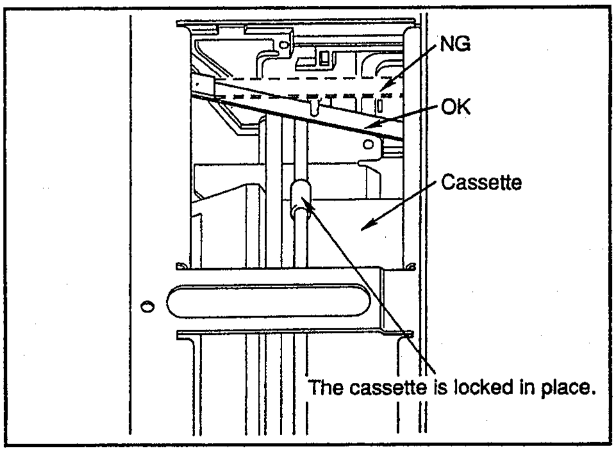
```
CASS-COMPARTMENT

INSERT A CASSETTE TAPE.




       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

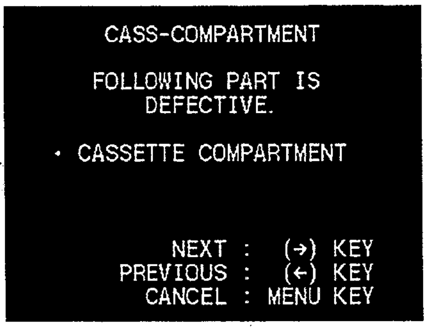
- Insert a large or small cassette tape into the unit.



```
CASS-COMPARTMENT

IS THE CASSETTE
LOCKED IN PLACE?




           NO :   NO KEY
          YES :  YES KEY
       CANCEL : MENU KEY
```

NG

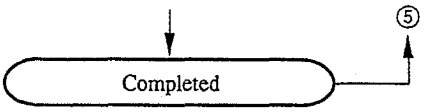

NG
OK
Cassette
The cassette is locked in place.

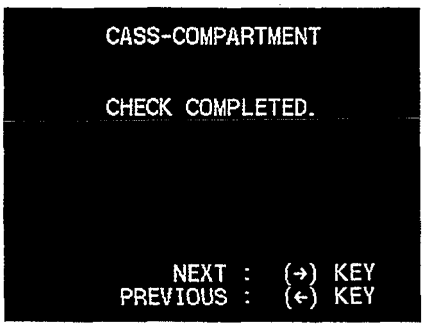


```
CASS-COMPARTMENT

FOLLOWING PART IS
DEFECTIVE.

· CASSETTE COMPARTMENT


         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- The cassette compartment without pressing a cassette tape surely is installed. Replace or repair the cassette compartment.

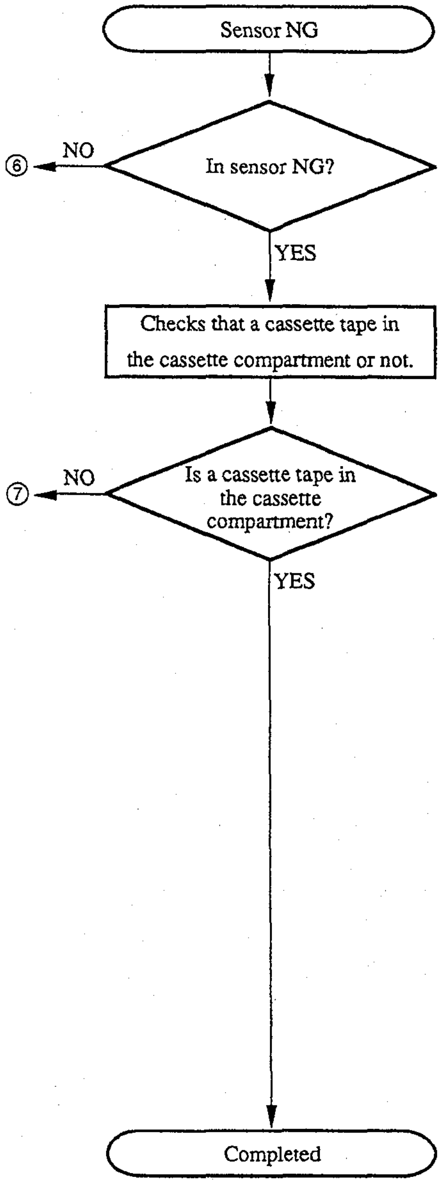
Continues to the next page.

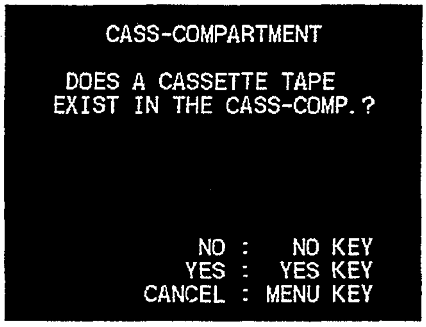

Completed
⑤



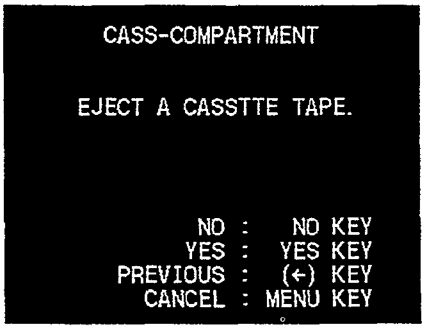
```
        CASS-COMPARTMENT

        CHECK COMPLETED.




            NEXT :   (→) KEY
        PREVIOUS :   (←) KEY
```

- When you would like to check the operation of the cassette compartment as to both large and small cassette tape, press the (←) key and insert the cassette tape of another size into the unit.

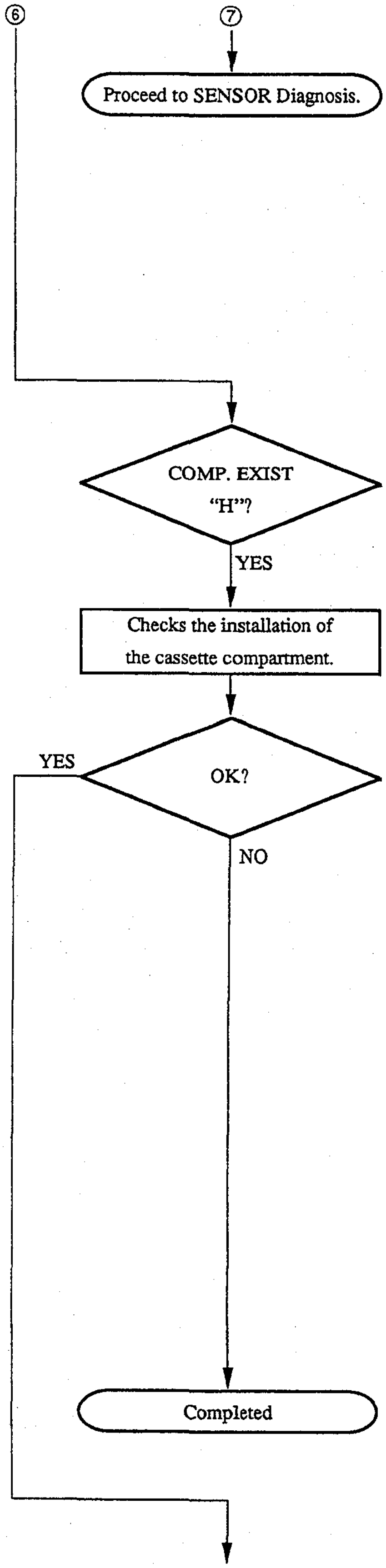

Sensor NG
In sensor NG?
NO
⑥
YES
Checks that a cassette tape in the cassette compartment or not.
Is a cassette tape in the cassette compartment?
NO
⑦
YES
Completed

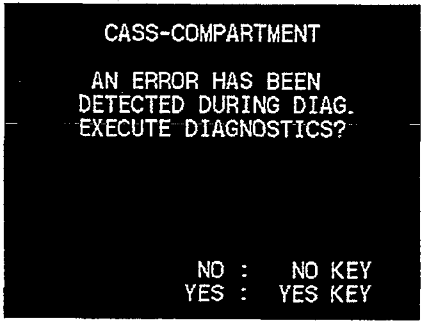


```
        CASS-COMPARTMENT

      DOES A CASSETTE TAPE
    EXIST IN THE CASS-COMP.?



              NO :   NO KEY
             YES :  YES KEY
          CANCEL : MENU KEY
```

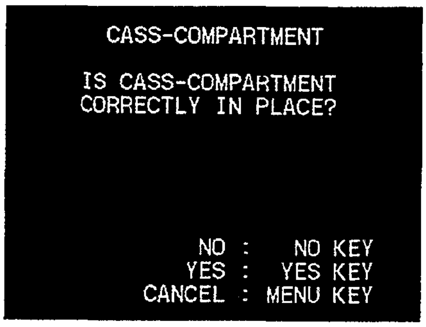


```
        CASS-COMPARTMENT

      EJECT A CASSTTE TAPE.



              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```


⑥
⑦
Proceed to SENSOR Diagnosis.
COMP. EXIST "H"?
YES
Checks the installation of the cassette compartment.
YES
OK?
NO
Completed

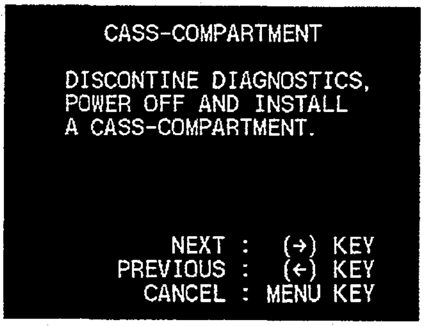


```
     CASS-COMPARTMENT

    AN ERROR HAS BEEN
   DETECTED DURING DIAG.
   EXECUTE DIAGNOSTICS?



              NO :   NO KEY
             YES :  YES KEY
```



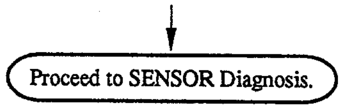
```
     CASS-COMPARTMENT

   IS CASS-COMPARTMENT
   CORRECTLY IN PLACE?



              NO :   NO KEY
             YES :  YES KEY
          CANCEL : MENU KEY
```

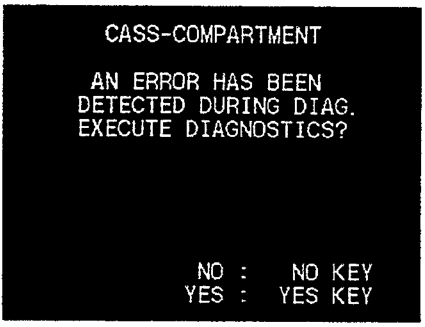
- Check that harnesses are connected correctly or not.



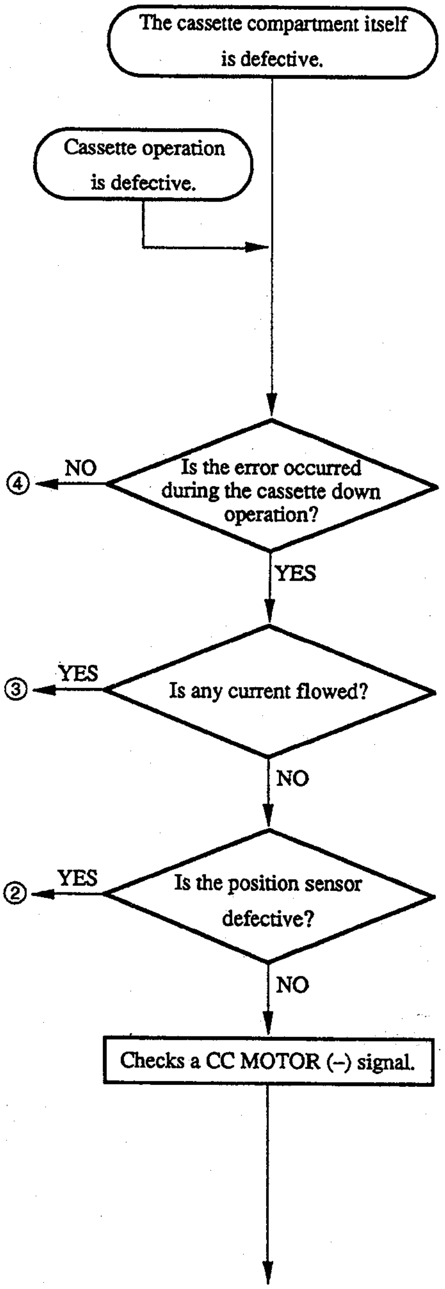
```
     CASS-COMPARTMENT

  DISCONTINE DIAGNOSTICS,
  POWER OFF AND INSTALL
  A CASS-COMPARTMENT.



            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

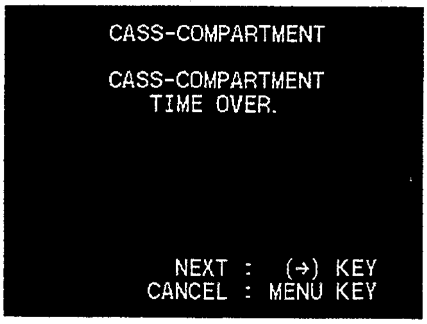
Continues to the next page.


Proceed to SENSOR Diagnosis.

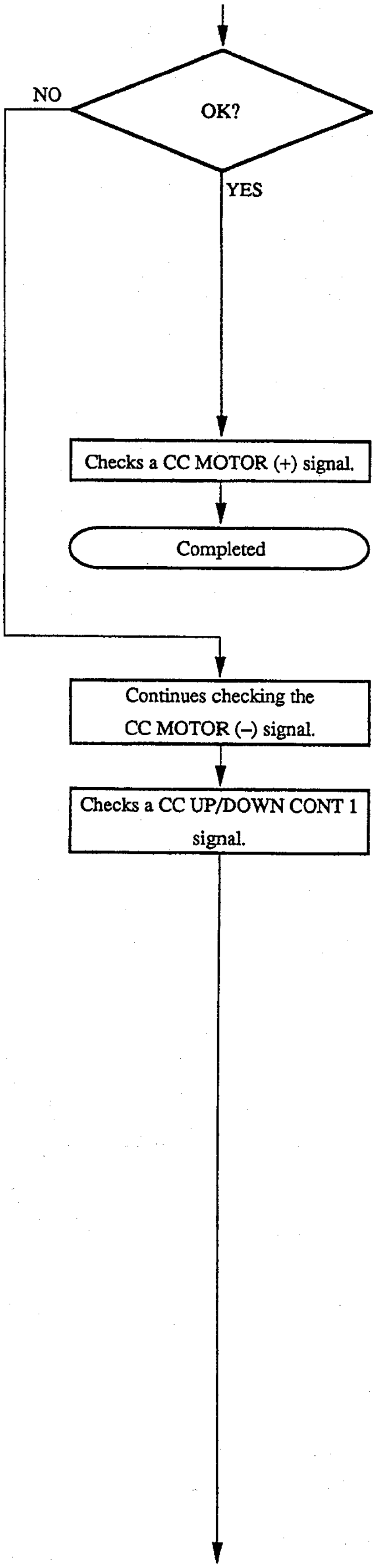


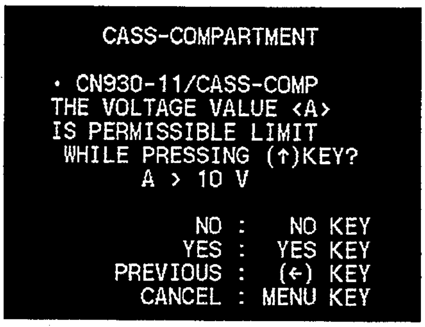
```
CASS-COMPARTMENT

 AN ERROR HAS BEEN
DETECTED DURING DIAG.
EXECUTE DIAGNOSTICS?




          NO :   NO KEY
         YES :  YES KEY
```


The cassette compartment itself is defective.
Cassette operation is defective.
Is the error occurred during the cassette down operation?
NO
④
YES
Is any current flowed?
YES
③
NO
Is the position sensor defective?
YES
②
NO
Checks a CC MOTOR (–) signal.



```
CASS-COMPARTMENT

CASS-COMPARTMENT
   TIME OVER.




        NEXT :  (→) KEY
      CANCEL : MENU KEY
```

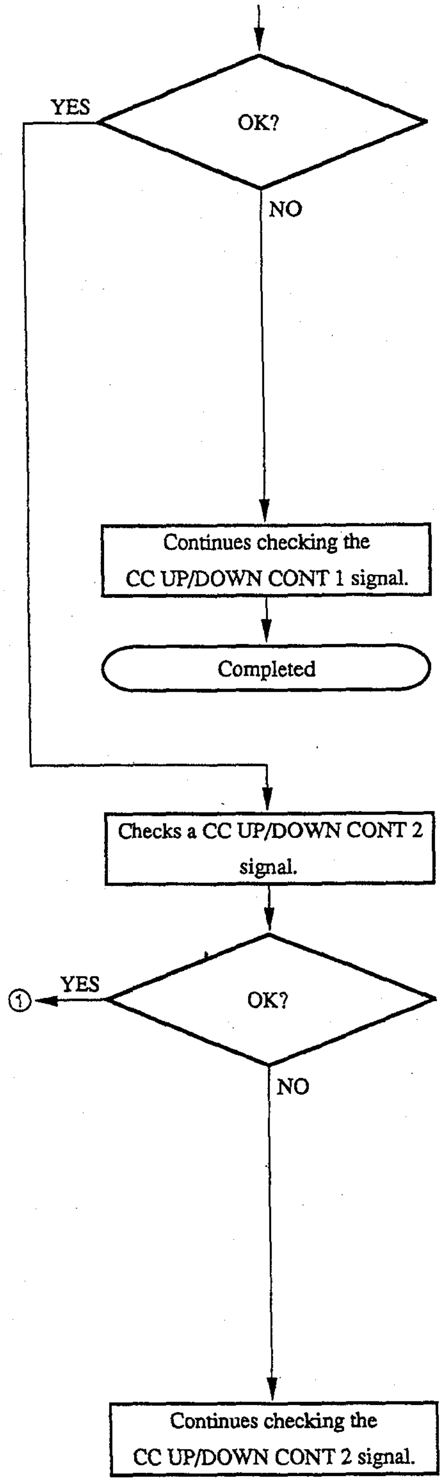

NO
OK?
YES
Checks a CC MOTOR (+) signal.
Completed
Continues checking the CC MOTOR (–) signal.
Checks a CC UP/DOWN CONT 1 signal.

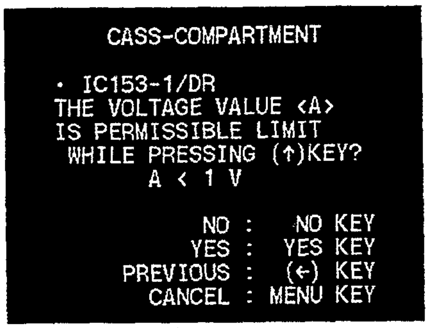


```
        CASS-COMPARTMENT

 • CN930-11/CASS-COMP
THE VOLTAGE VALUE <A>
IS PERMISSIBLE LIMIT
 WHILE PRESSING (↑)KEY?
       A > 10 V

              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- Check that the voltage (A) is more than 10 V while pressing the (↑) key.

Continues to the next page.

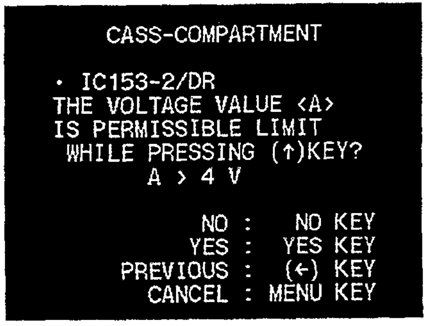

YES
OK?
NO
Continues checking the CC UP/DOWN CONT 1 signal.
Completed
Checks a CC UP/DOWN CONT 2 signal.
①
YES
OK?
NO
Continues checking the CC UP/DOWN CONT 2 signal.



```
        CASS-COMPARTMENT

 • IC153-1/DR
 THE VOLTAGE VALUE <A>
 IS PERMISSIBLE LIMIT
  WHILE PRESSING (↑)KEY?
        A < 1 V

             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- IC153/DR-214 (L-2)

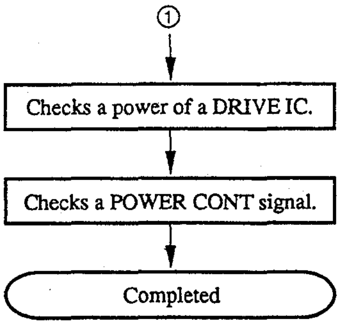
- Check that the voltage (A) is less than 1 V while pressing the (↑) key.

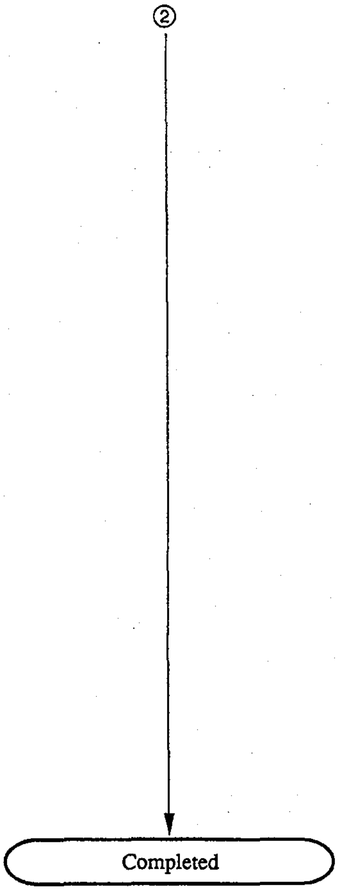


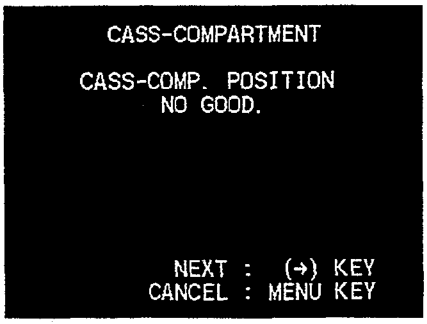
```
        CASS-COMPARTMENT

 • IC153-2/DR
 THE VOLTAGE VALUE <A>
 IS PERMISSIBLE LIMIT
  WHILE PRESSING (↑)KEY?
        A > 4 V

             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- IC153/DR-214 (L-2)

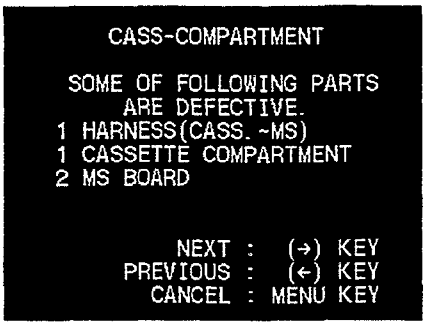
- Check that the voltage (A) is more than 4 V while pressing the (↑) key.


①
Checks a power of a DRIVE IC.
Checks a POWER CONT signal.
Completed


②
Completed

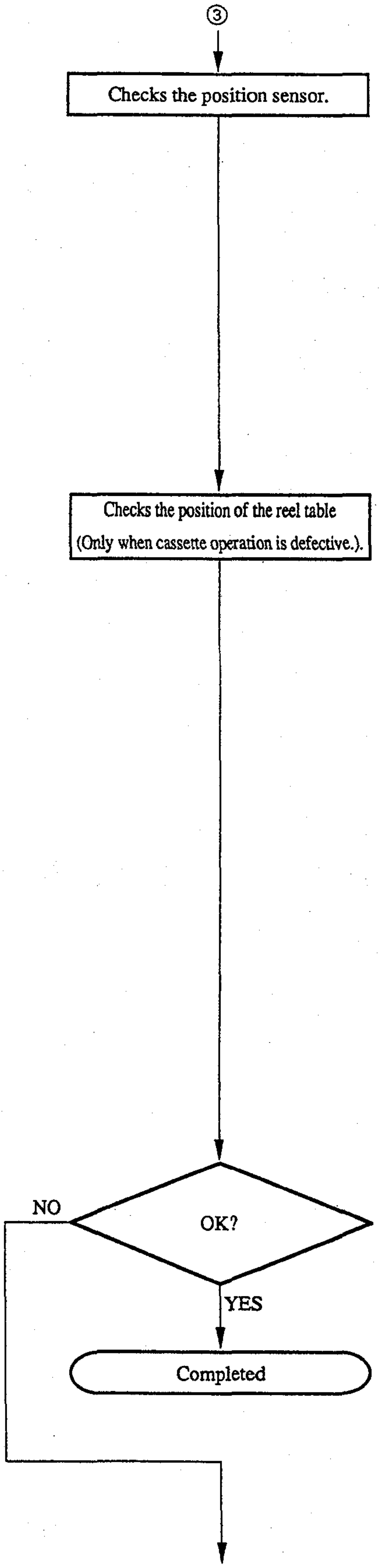


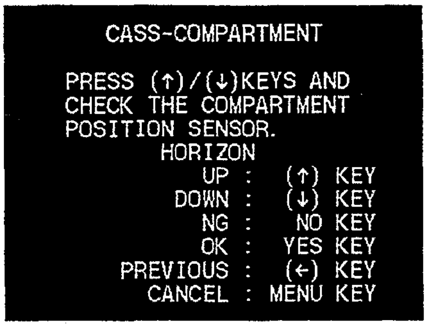
```
CASS-COMPARTMENT

CASS-COMP. POSITION
NO GOOD.




       NEXT :  (→) KEY
     CANCEL : MENU KEY
```



```
CASS-COMPARTMENT

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 HARNESS(CASS.-MS)
1 CASSETTE COMPARTMENT
2 MS BOARD

        NEXT :  (→) KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

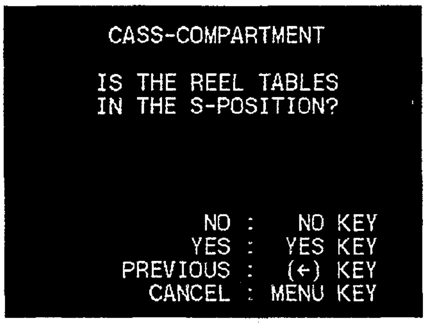
- A cassette compartment position sensor does not operate correctly.
  Check harnesses. When the harnesses are not defective, replace a cassette compartment to a new one.


③
Checks the position sensor.
Checks the position of the reel table
(Only when cassette operation is defective.).
OK?
NO
YES
Completed

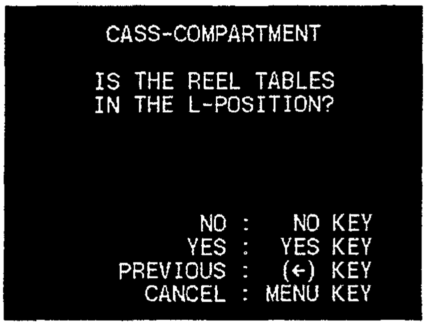


```
        CASS-COMPARTMENT

   PRESS (↑)/(↓)KEYS AND
   CHECK THE COMPARTMENT
   POSITION SENSOR.
           HORIZON
                UP :   (↑) KEY
              DOWN :   (↓) KEY
                NG :    NO KEY
                OK :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL :  MENU KEY
```

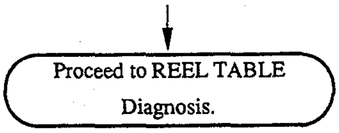
- Check that the information display of the position sensors is changed by moving the cassette compartment with pressing the (↑) or (↓) key.

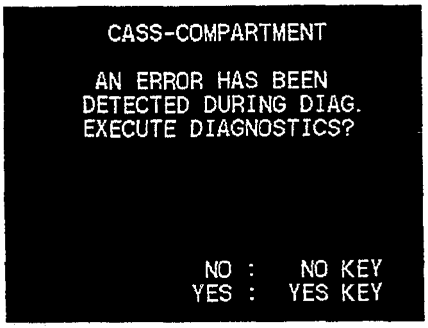


```
        CASS-COMPARTMENT

      IS THE REEL TABLES
      IN THE S-POSITION?




                NO :    NO KEY
               YES :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL :  MENU KEY
```

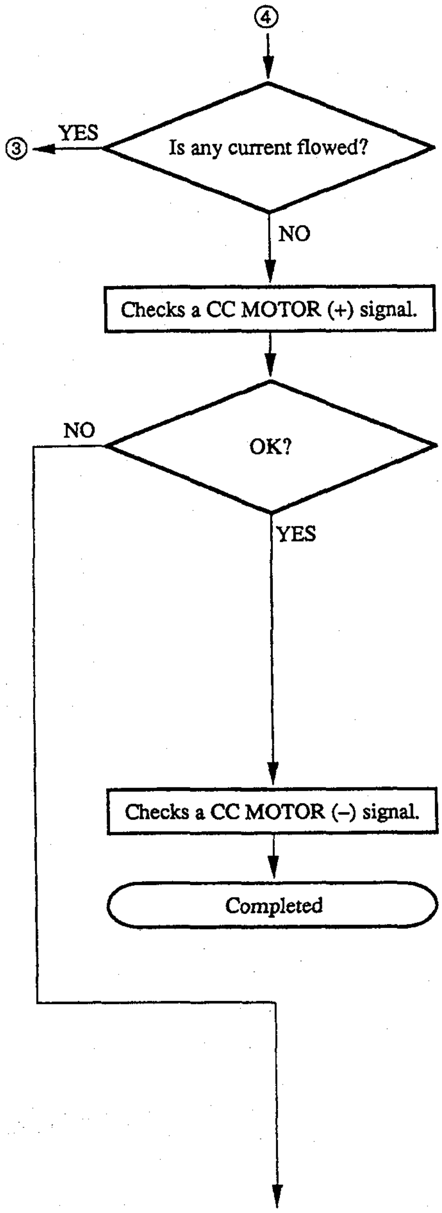


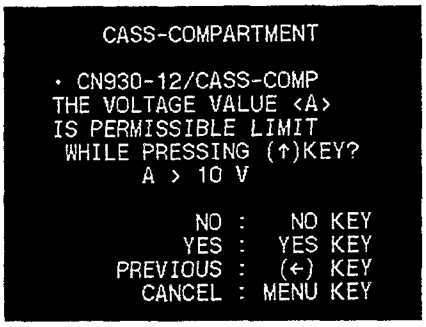
```
        CASS-COMPARTMENT

      IS THE REEL TABLES
      IN THE L-POSITION?




                NO :    NO KEY
               YES :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL :  MENU KEY
```


Proceed to REEL TABLE Diagnosis.



```
CASS-COMPARTMENT

AN ERROR HAS BEEN
DETECTED DURING DIAG.
EXECUTE DIAGNOSTICS?



        NO :   NO KEY
       YES :  YES KEY
```

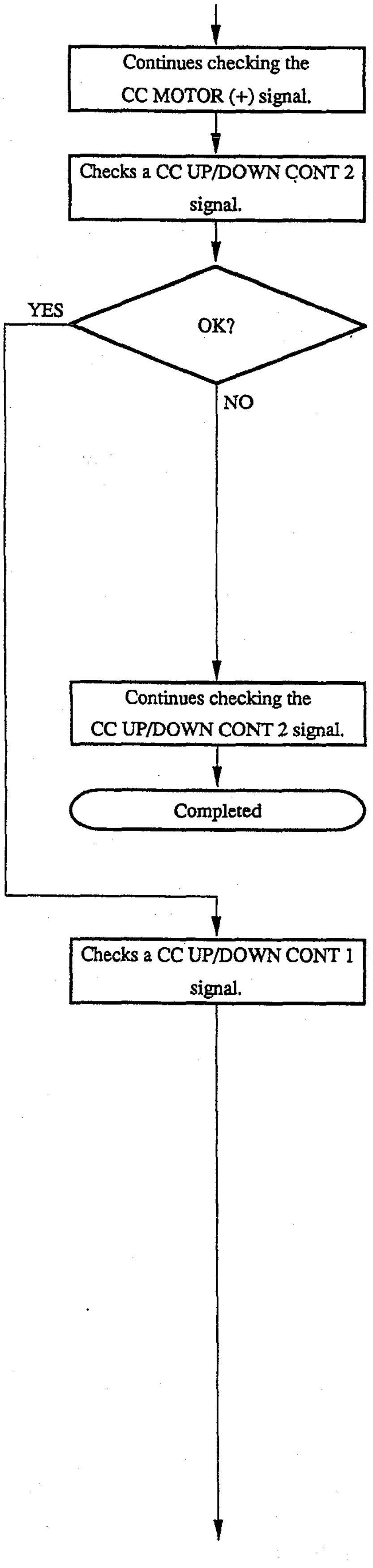

④
YES
③
Is any current flowed?
NO
Checks a CC MOTOR (+) signal.
NO
OK?
YES
Checks a CC MOTOR (–) signal.
Completed

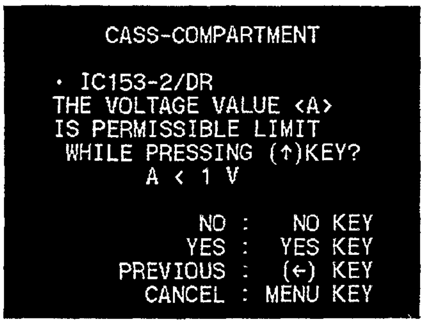


```
CASS-COMPARTMENT

 • CN930-12/CASS-COMP
THE VOLTAGE VALUE <A>
IS PERMISSIBLE LIMIT
 WHILE PRESSING (↑)KEY?
       A > 10 V

          NO :   NO KEY
         YES :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

- Check that the voltage (A) is more than 10 V while pressing the (↑) key.

Continues to the next page.

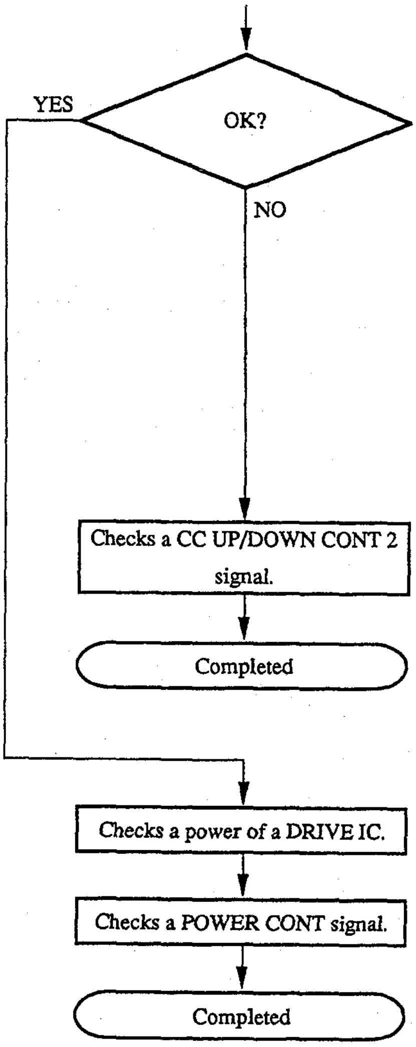

Continues checking the CC MOTOR (+) signal.
Checks a CC UP/DOWN CONT 2 signal.
OK?
YES
NO
Continues checking the CC UP/DOWN CONT 2 signal.
Completed
Checks a CC UP/DOWN CONT 1 signal.

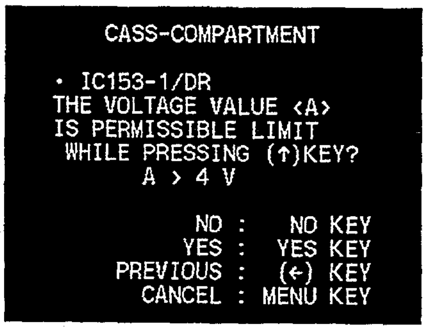


```
        CASS-COMPARTMENT

 · IC153-2/DR
THE VOLTAGE VALUE <A>
IS PERMISSIBLE LIMIT
 WHILE PRESSING (↑)KEY?
       A < 1 V

             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- IC153/DR-214 (L-2)

- Checks that the voltage (A) is less than 1 V while pressing the (↑) key.


YES
OK?
NO
Checks a CC UP/DOWN CONT 2 signal.
Completed
Checks a power of a DRIVE IC.
Checks a POWER CONT signal.
Completed

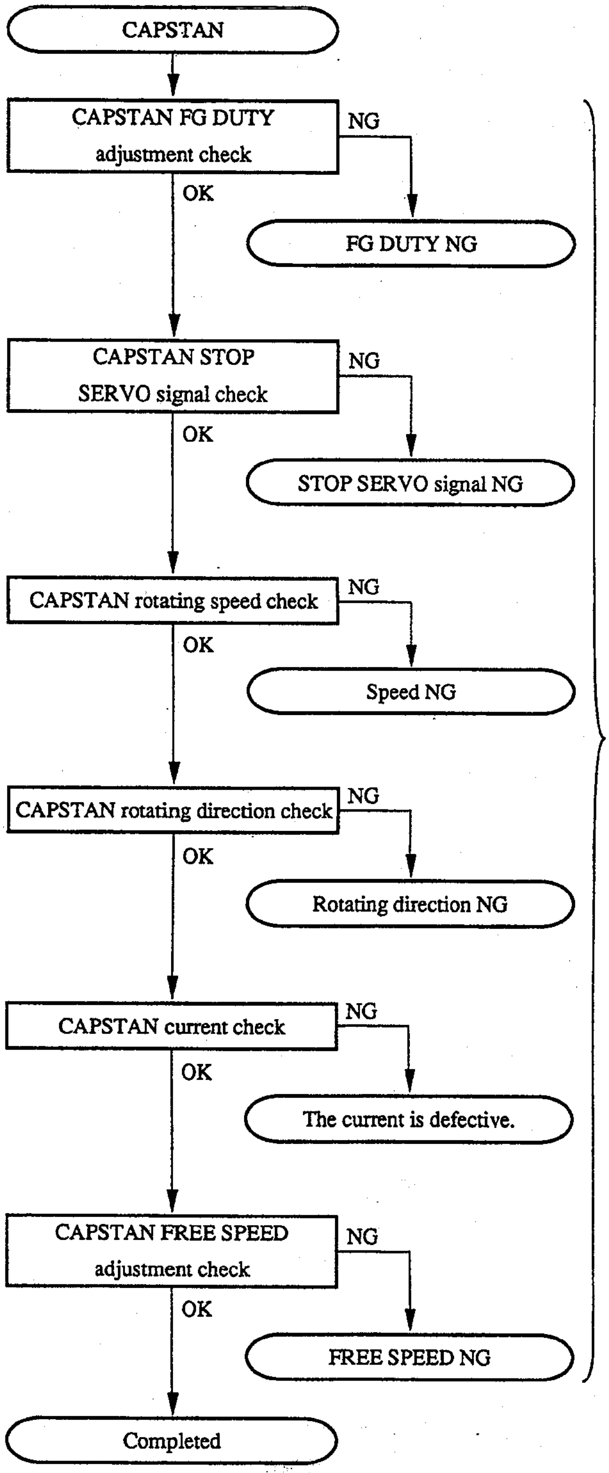


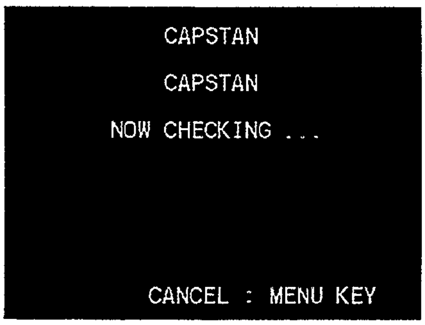
```
CASS-COMPARTMENT

• IC153-1/DR
THE VOLTAGE VALUE <A>
IS PERMISSIBLE LIMIT
 WHILE PRESSING (↑)KEY?
       A > 4 V

           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- IC153/DR-214 (L-2)

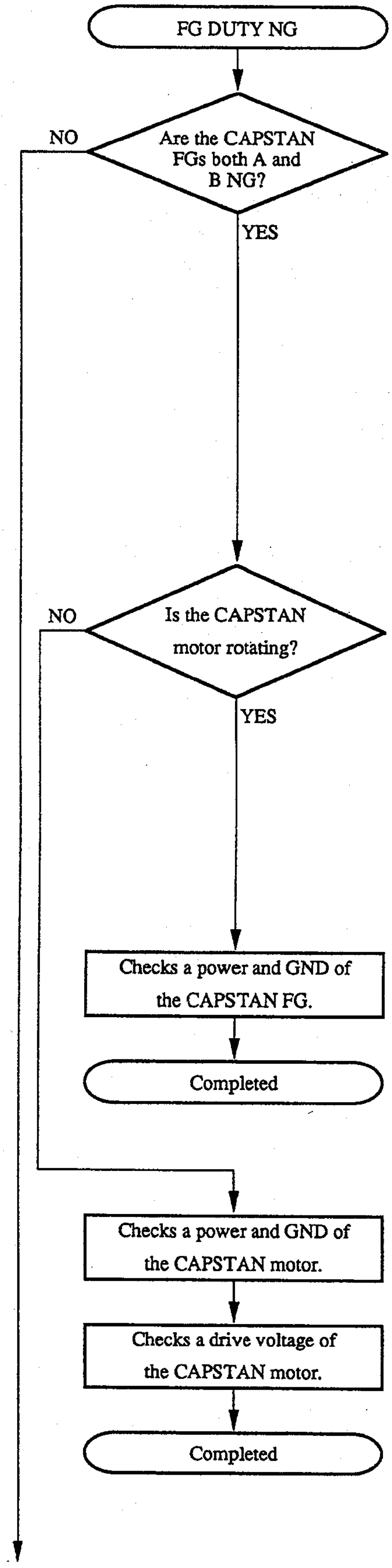
- Checks that the voltage (A) is more than 4 V while pressing the (↑) key.

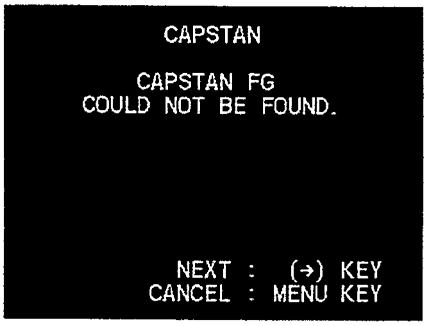
(11) CAPSTAN Diagnosis


CAPSTAN
CAPSTAN FG DUTY adjustment check
NG
OK
FG DUTY NG
CAPSTAN STOP SERVO signal check
NG
OK
STOP SERVO signal NG
CAPSTAN rotating speed check
NG
OK
Speed NG
CAPSTAN rotating direction check
NG
OK
Rotating direction NG
CAPSTAN current check
NG
OK
The current is defective.
CAPSTAN FREE SPEED adjustment check
NG
OK
FREE SPEED NG
Completed

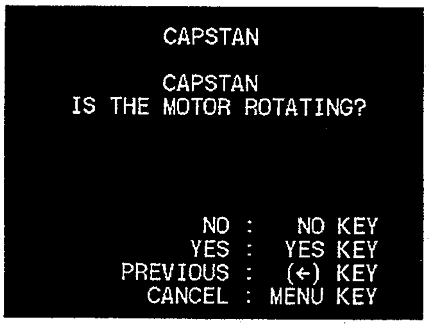

```
CAPSTAN
CAPSTAN
NOW CHECKING ...


CANCEL : MENU KEY
```

- The unit checks automatically.


FG DUTY NG
NO
Are the CAPSTAN FGs both A and B NG?
YES
NO
Is the CAPSTAN motor rotating?
YES
Checks a power and GND of the CAPSTAN FG.
Completed
Checks a power and GND of the CAPSTAN motor.
Checks a drive voltage of the CAPSTAN motor.
Completed



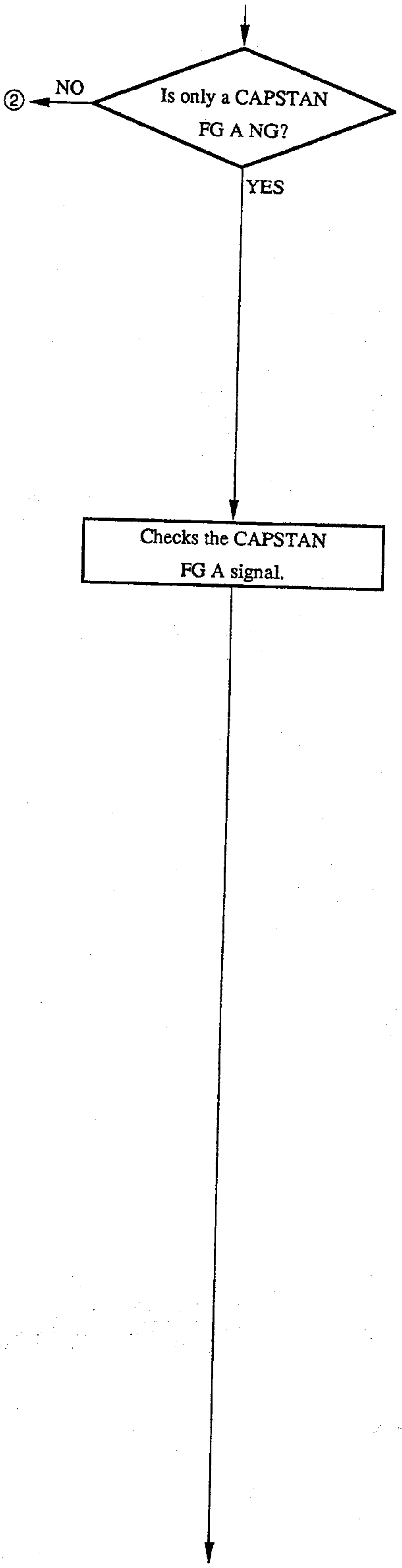
```
CAPSTAN

CAPSTAN FG
COULD NOT BE FOUND.

NEXT :  (→) KEY
CANCEL : MENU KEY
```

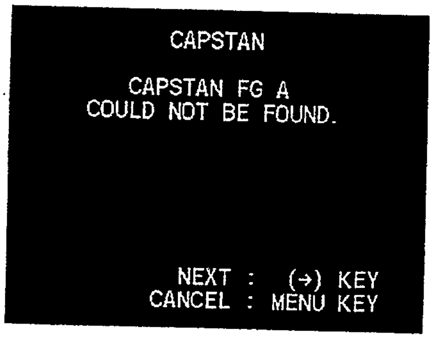


```
CAPSTAN

CAPSTAN
IS THE MOTOR ROTATING?

NO :    NO KEY
YES :   YES KEY
PREVIOUS :  (←) KEY
CANCEL : MENU KEY
```

- Check that the capstan motor is rotating or not.

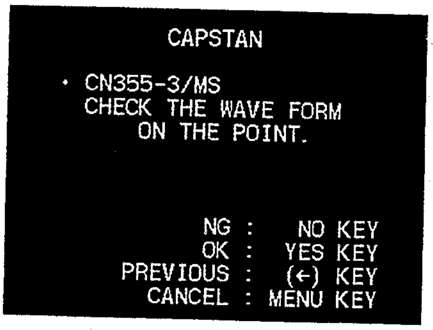
Continues to the next page.


②
NO
Is only a CAPSTAN FG A NG?
YES
Checks the CAPSTAN FG A signal.


CAPSTAN

CAPSTAN FG A
COULD NOT BE FOUND.

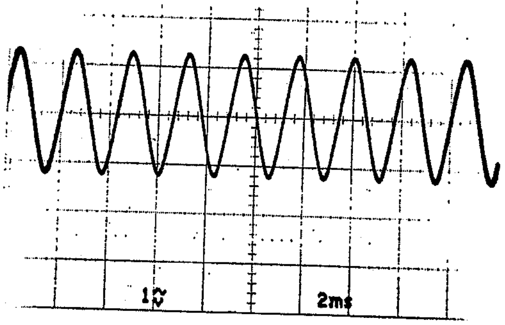
NEXT : (→) KEY
CANCEL : MENU KEY

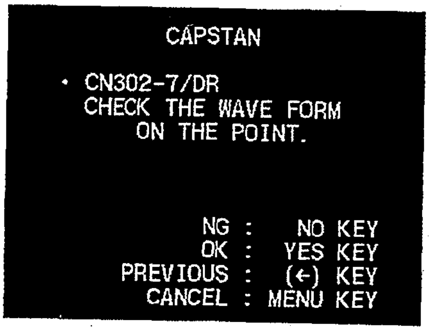

CAPSTAN

- CN355-3/MS
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN355-3/MS-39 (D-3) waveform
PB mode



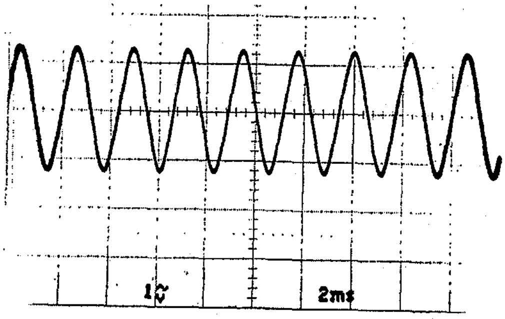


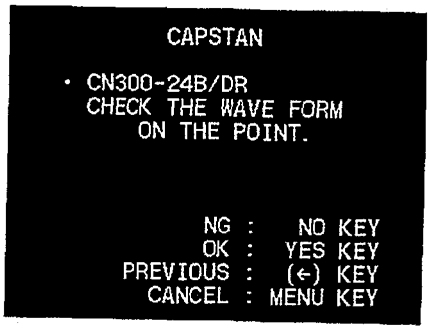
CAPSTAN

- CN302-7/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN302-7/DR-214 (H-5) waveform :
  PB mode



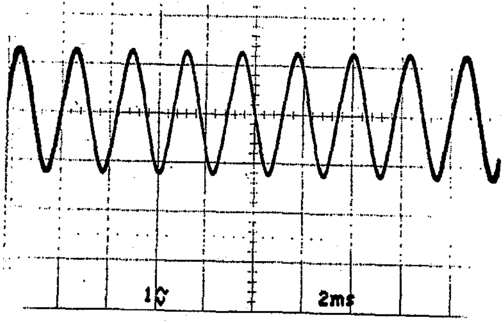


CAPSTAN

- CN300-24B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN300-24B/DR-214 (H-1) waveform
  PB mode



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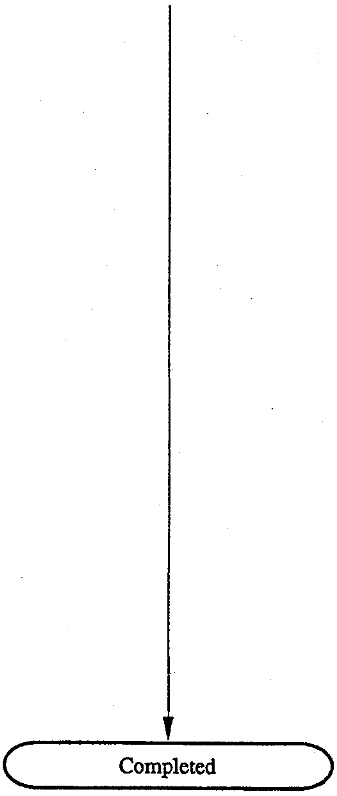
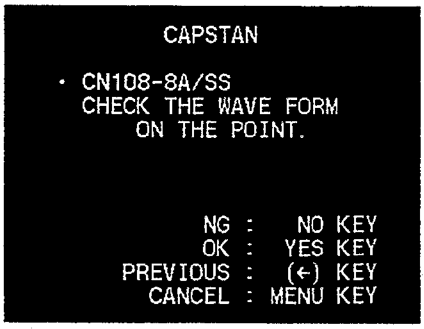
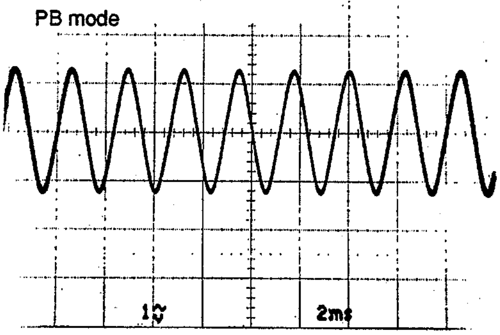
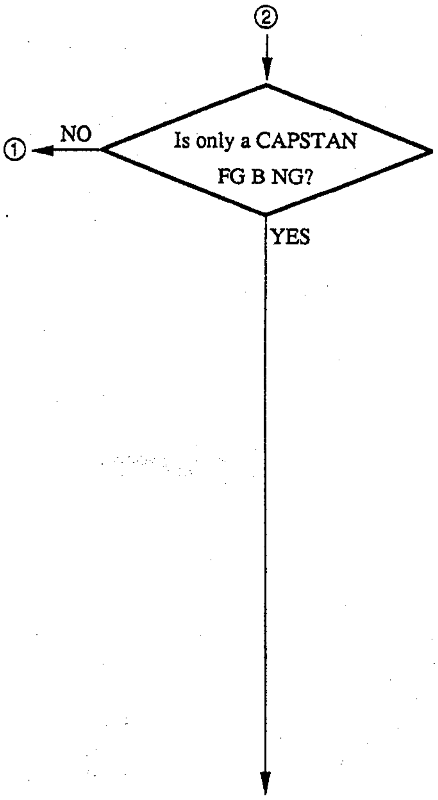


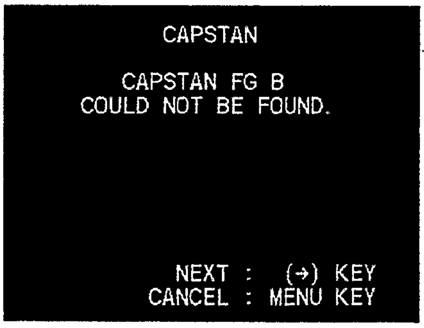


```
CAPSTAN

 • CN108-8A/SS
   CHECK THE WAVE FORM
      ON THE POINT.



               NG :    NO KEY
               OK :   YES KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

- CN108-8A/SS-61 (K-6) waveform
  PB mode

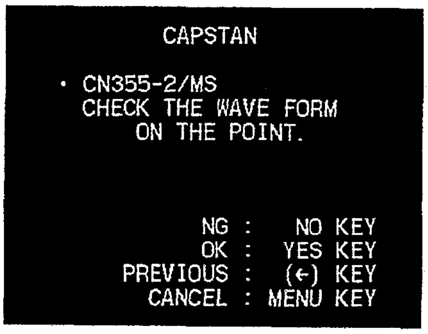



②
NO
①
Is only a CAPSTAN FG B NG?
YES



```
CAPSTAN

   CAPSTAN FG B
COULD NOT BE FOUND.




         NEXT :   (→) KEY
       CANCEL : MENU KEY
```

Checks the CAPSTAN FG B signal.

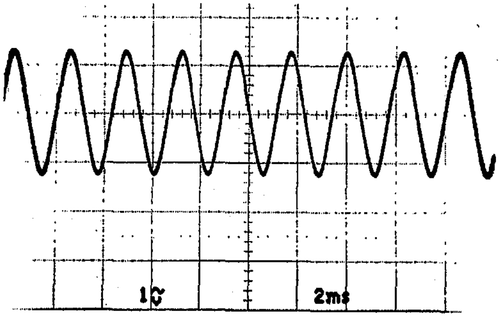


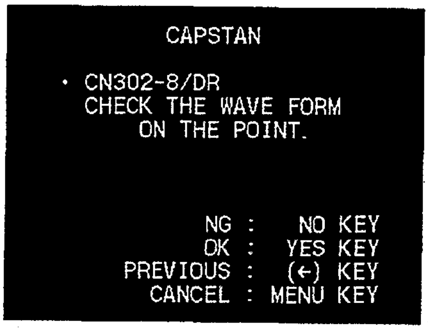
CAPSTAN

- CN355-2/MS
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN355-2/MS-39 (D-3) waveform
  PB mode



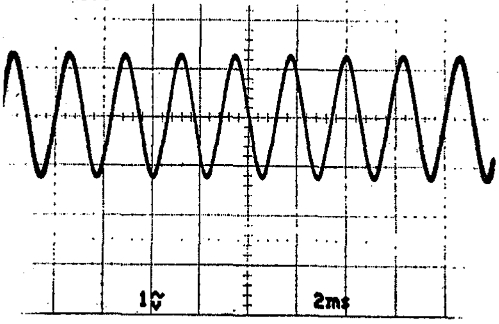


CAPSTAN

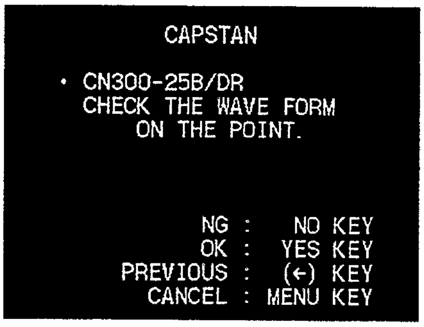
- CN302-8/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN302-8/DR-214 (H-5) waveform
  PB mode



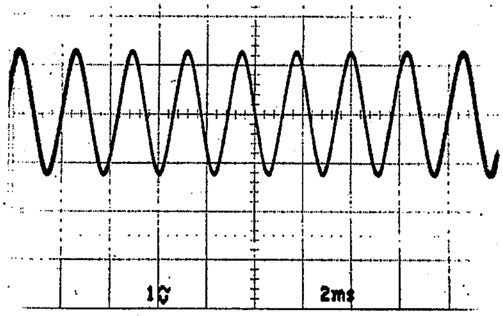
Continues to the next page.

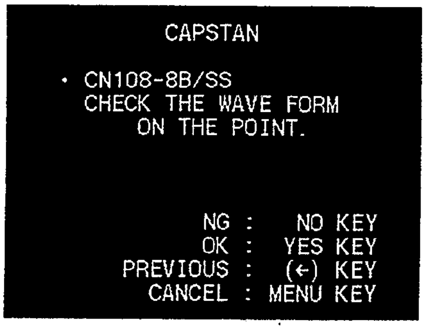

CAPSTAN

- CN300-25B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN300-25B/DR-214 (H-1) wavefor
  PB mode

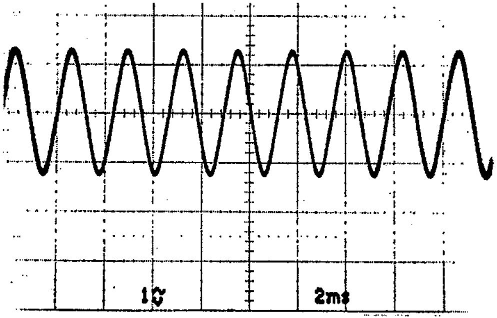



CAPSTAN

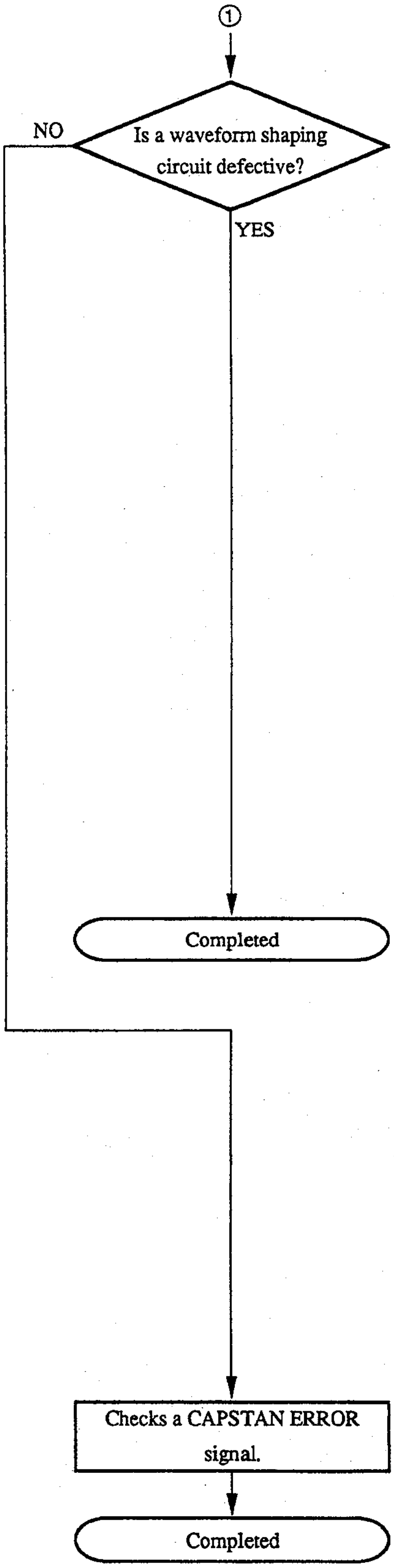
- CN108-8B/SS
  CHECK THE WAVE FORM
  ON THE POINT.

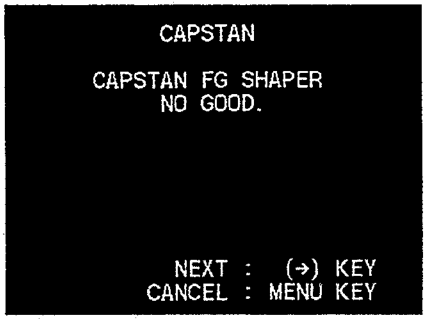
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN108-8B/SS-61 (K-6) waveform
  PB mode

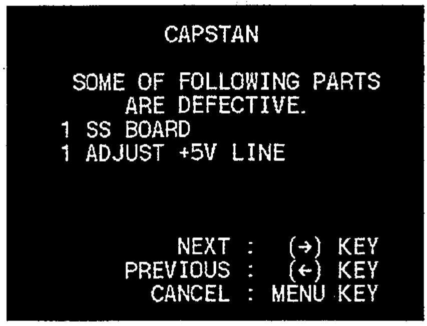


Completed


①
Is a waveform shaping circuit defective?
NO
YES
Completed
Checks a CAPSTAN ERROR signal.
Completed

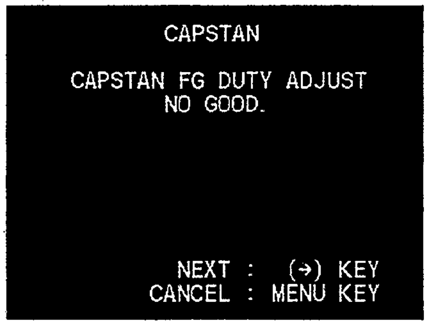


```
CAPSTAN

CAPSTAN FG SHAPER
NO GOOD.



NEXT :   (→) KEY
CANCEL : MENU KEY
```



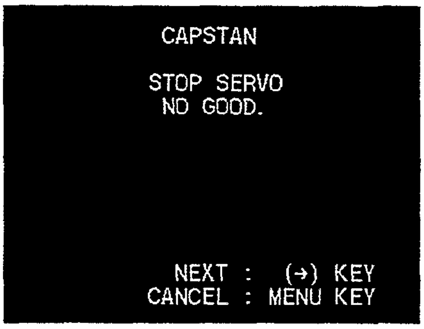
```
CAPSTAN

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 SS BOARD
1 ADJUST +5V LINE


NEXT :     (→) KEY
PREVIOUS : (←) KEY
CANCEL :   MENU KEY
```

- The probable cause is that a ADJUST +5 V signal is not supplied to the SS board.

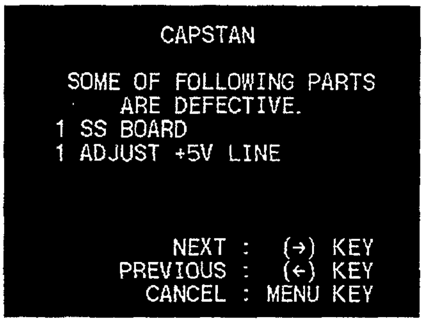


```
CAPSTAN

CAPSTAN FG DUTY ADJUST
NO GOOD.



NEXT :   (→) KEY
CANCEL : MENU KEY
```

STOP SERVO signal NG



```
        CAPSTAN

      STOP SERVO
       NO GOOD.



          NEXT :   (→) KEY
        CANCEL : MENU KEY
```

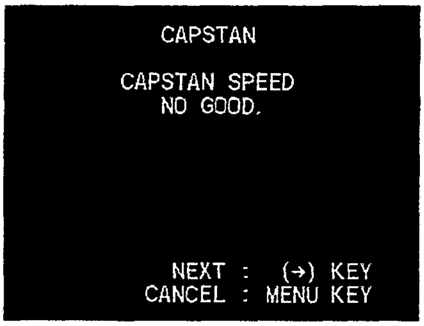


```
        CAPSTAN

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 SS BOARD
 1 ADJUST +5V LINE


          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

- The probable cause is that a ADJUST +5 V signal is not supplied to the SS board.

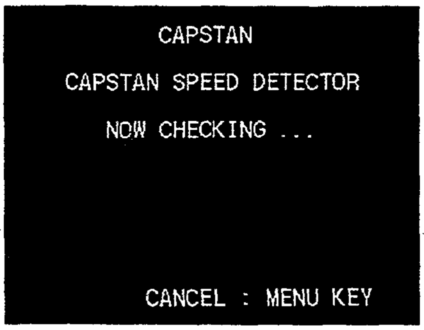
Completed

SPEED NG



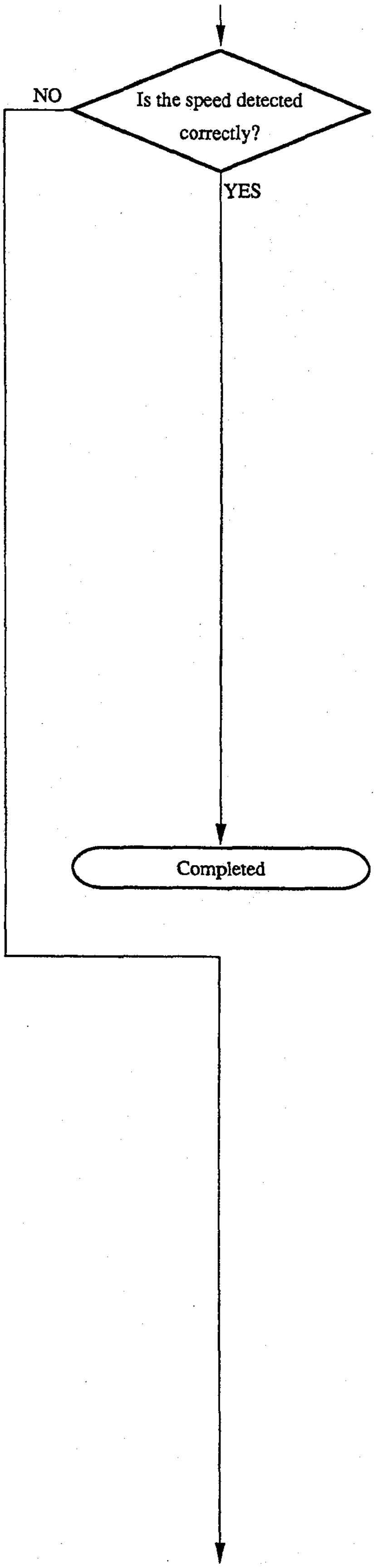
```
        CAPSTAN

     CAPSTAN SPEED
        NO GOOD.



          NEXT :   (→) KEY
        CANCEL : MENU KEY
```

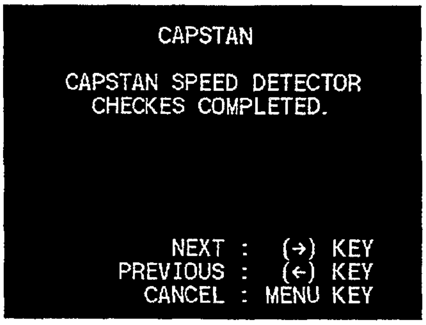
Checks a speed detecting circuit of the CAPSTAN.



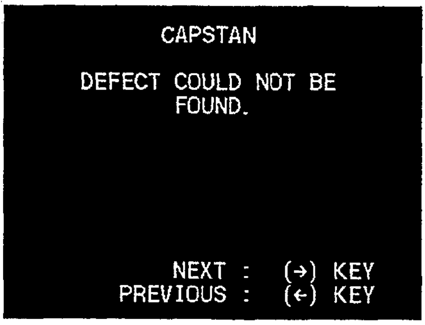
```
        CAPSTAN

  CAPSTAN SPEED DETECTOR

     NOW CHECKING ...



        CANCEL : MENU KEY
```

- The unit checks automatically.


NO
Is the speed detected correctly?
YES
Completed



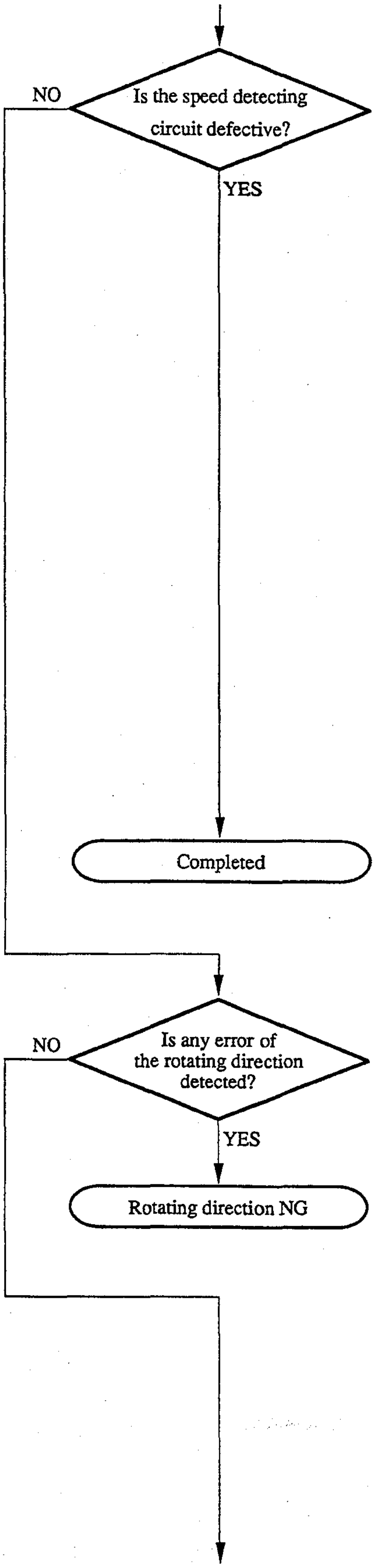
```
              CAPSTAN

      CAPSTAN SPEED DETECTOR
        CHECKES COMPLETED.




             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
           CANCEL : MENU KEY
```

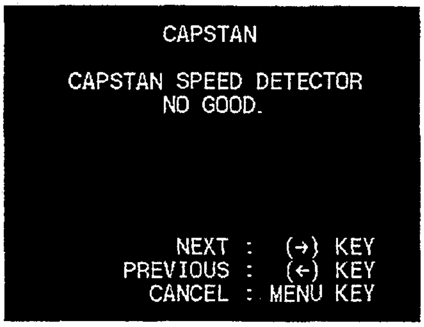


```
              CAPSTAN

        DEFECT COULD NOT BE
              FOUND.




             NEXT :   (→) KEY
         PREVIOUS :   (←) KEY
```

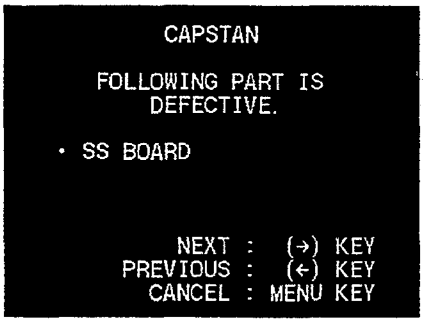
- Check that the connections of harnesses and so on are faulty or not.

Continues to the next page.


NO
Is the speed detecting circuit defective?
YES
Completed
NO
Is any error of the rotating direction detected?
YES
Rotating direction NG

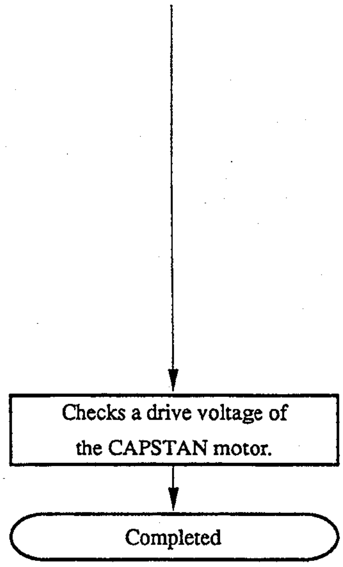


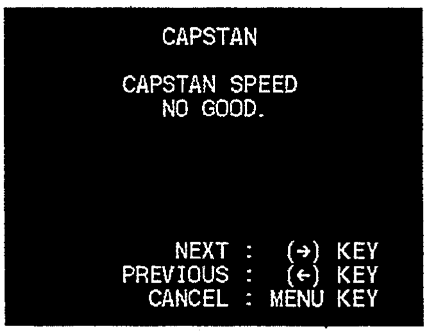
```
CAPSTAN

CAPSTAN SPEED DETECTOR
NO GOOD.



    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL : MENU KEY
```



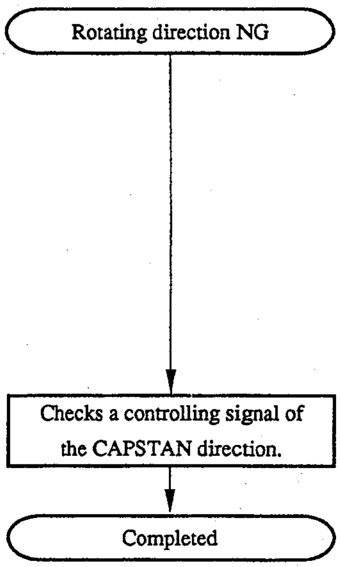
```
CAPSTAN

FOLLOWING PART IS
DEFECTIVE.

• SS BOARD


    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL : MENU KEY
```

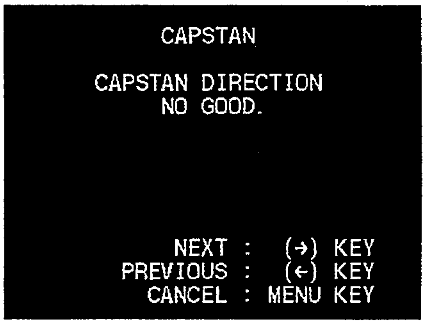
- The probable cause is that the capstan 2FG circuit on the SS board is defective.


Checks a drive voltage of the CAPSTAN motor.
Completed

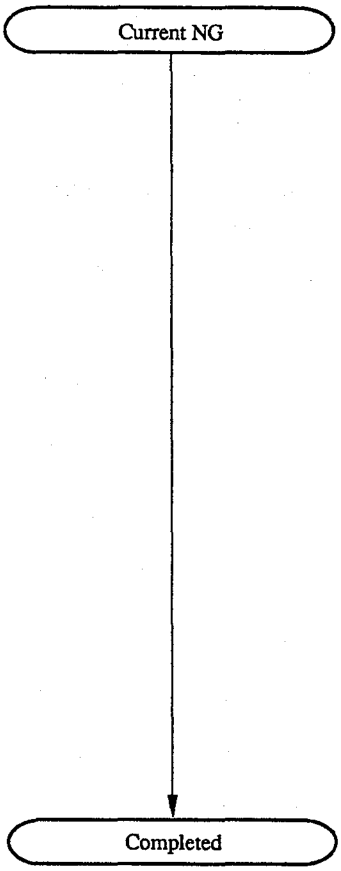


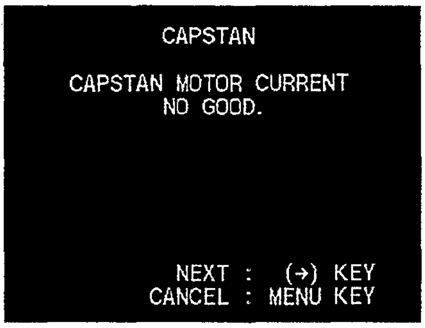
```
CAPSTAN

CAPSTAN SPEED
NO GOOD.



    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL : MENU KEY
```


Rotating direction NG
Checks a controlling signal of the CAPSTAN direction.
Completed

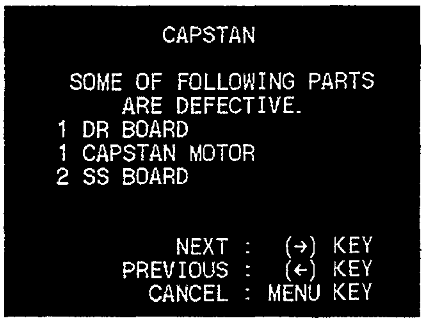


```
CAPSTAN

CAPSTAN DIRECTION
NO GOOD.



    NEXT :   (→) KEY
PREVIOUS :   (←) KEY
  CANCEL : MENU KEY
```



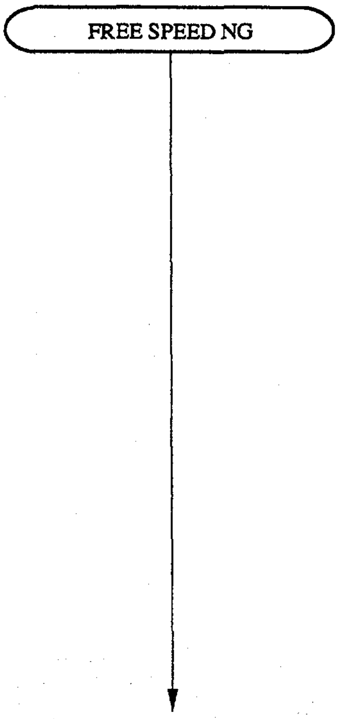


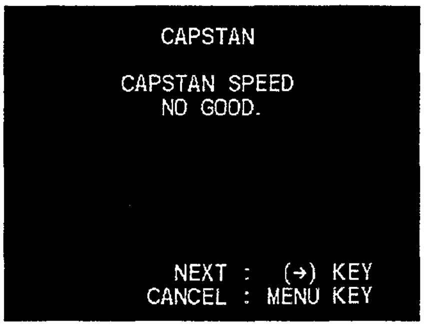
```
              CAPSTAN

       CAPSTAN MOTOR CURRENT
             NO GOOD.




              NEXT :   (→) KEY
            CANCEL : MENU KEY
```



```
              CAPSTAN

       SOME OF FOLLOWING PARTS
           ARE DEFECTIVE.
     1 DR BOARD
     1 CAPSTAN MOTOR
     2 SS BOARD

              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

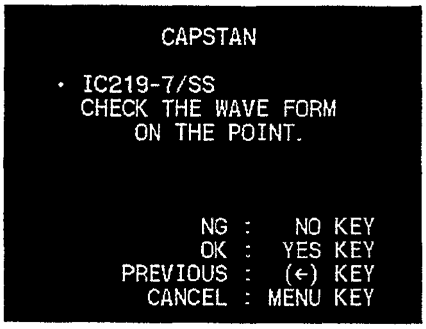
- The probable cause is that the capstan current detecting circuit is defective or an extraordinary current is flowing through the capstan motor.





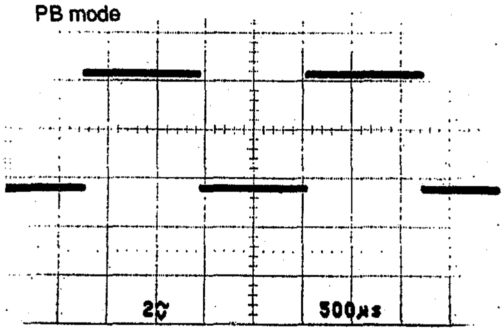
```
              CAPSTAN

           CAPSTAN SPEED
             NO GOOD.




              NEXT :   (→) KEY
            CANCEL : MENU KEY
```

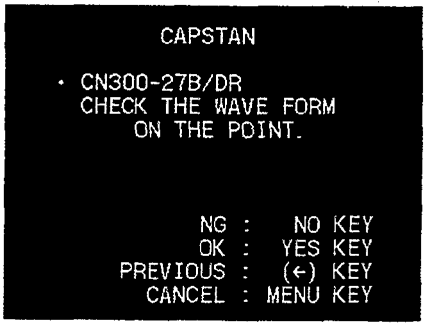
Checks a CAPSTAN FG A NORM. signal.



```
              CAPSTAN

   • IC219-7/SS
     CHECK THE WAVE FORM
         ON THE POINT.


                  NG :    NO KEY
                  OK :   YES KEY
            PREVIOUS :   (←) KEY
              CANCEL : MENU KEY
```

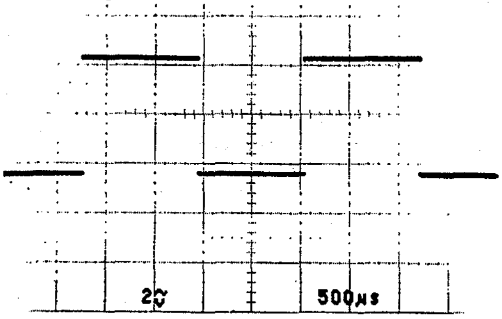
• IC219-7/SS-61 (H-1) waveform
PB mode



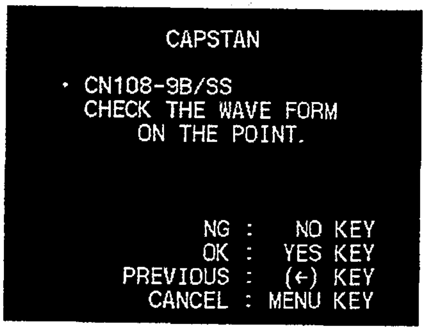


```
              CAPSTAN

   • CN300-27B/DR
     CHECK THE WAVE FORM
         ON THE POINT.


                  NG :    NO KEY
                  OK :   YES KEY
            PREVIOUS :   (←) KEY
              CANCEL : MENU KEY
```

• CN300-27B/DR-214 (H-1) waveform
PB mode



Continues to the next page.

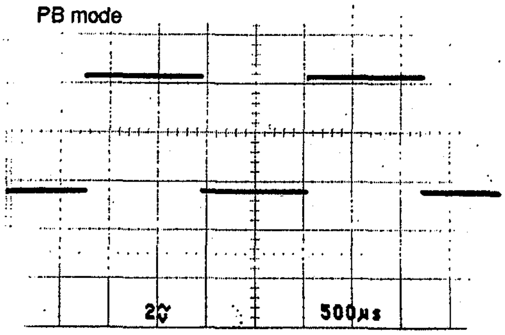


CAPSTAN

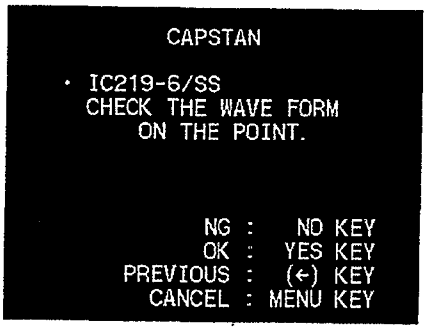
• CN108-9B/SS
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

• CN108-9B/SS-61 (K-6) waveform
PB mode



Checks a CAPSTAN
FG B NORM. signal.

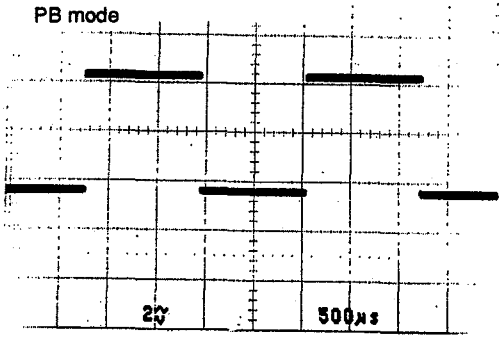


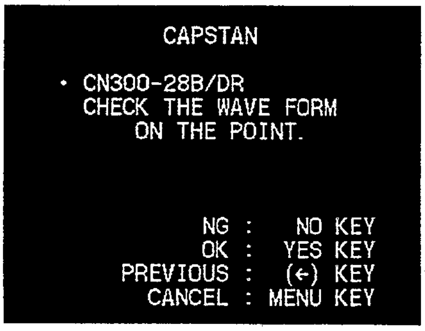
CAPSTAN

• IC219-6/SS
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

• IC219-6/SS-61 (H-1) waveform
PB mode

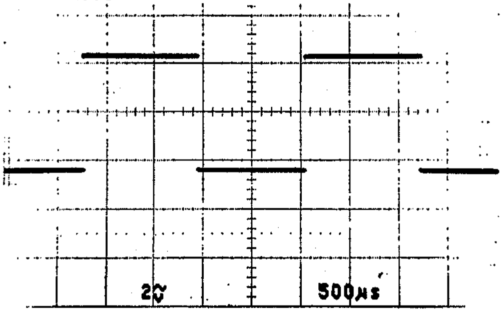


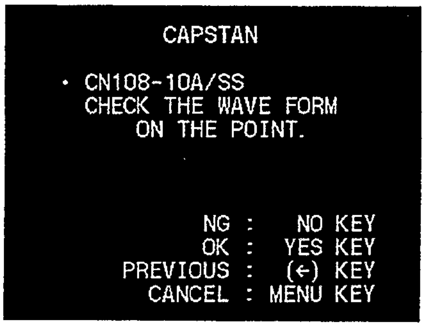

CAPSTAN

• CN300-28B/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

• CN300-28B/DR-214 (H-1) waveform
PB mode

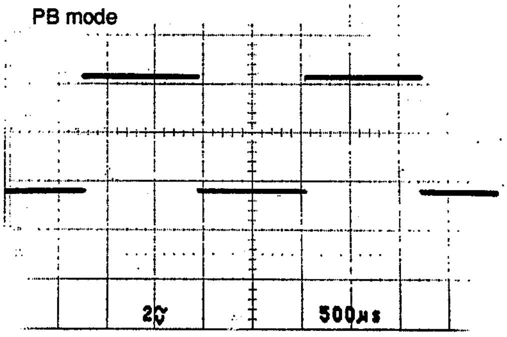



CAPSTAN

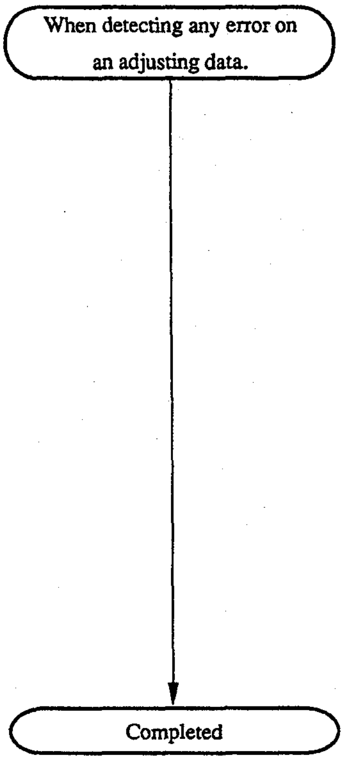
• CN108-10A/SS
CHECK THE WAVE FORM
ON THE POINT.

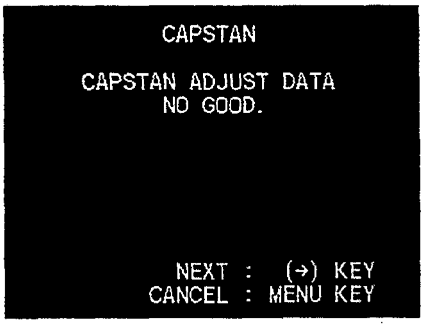
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

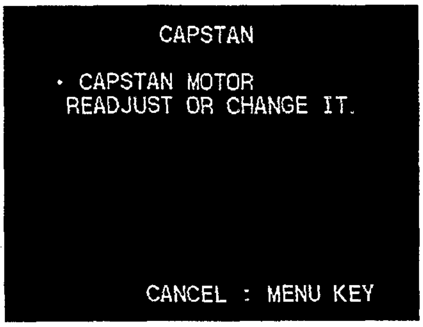
• CN108-10A/SS-61 (K-6) waveform
PB mode

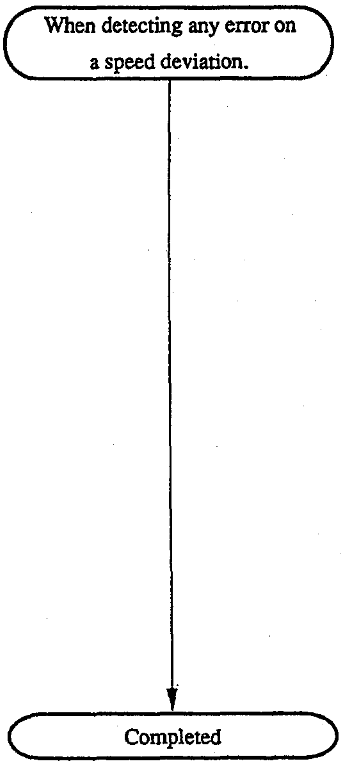


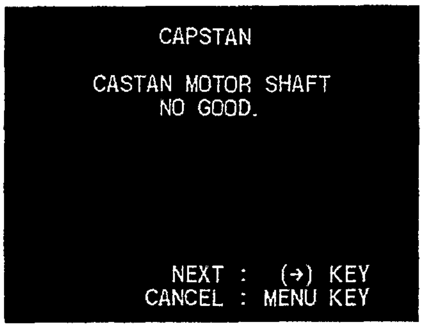
Completed

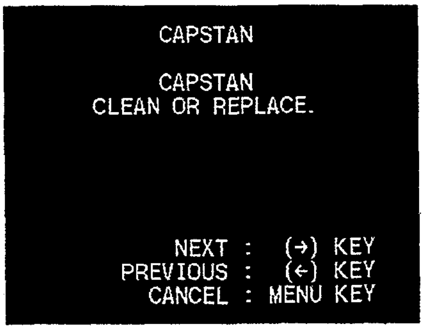

When detecting any error on an adjusting data.
Completed


```
        CAPSTAN

 CAPSTAN ADJUST DATA
        NO GOOD.




        NEXT :   (→) KEY
      CANCEL : MENU KEY
```

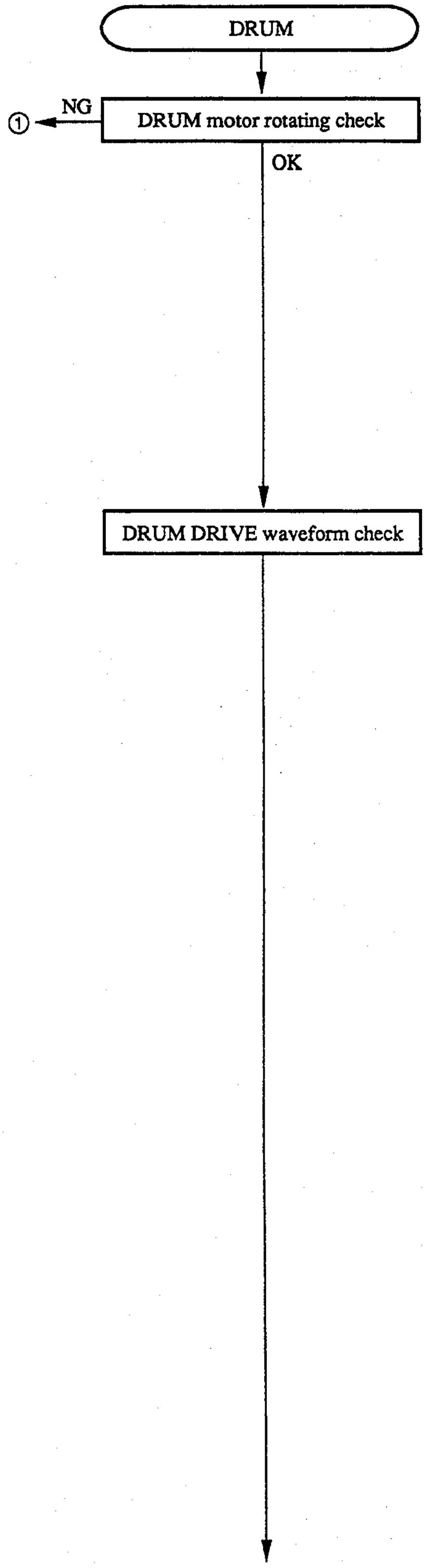

```
        CAPSTAN

 • CAPSTAN MOTOR
 READJUST OR CHANGE IT.




      CANCEL : MENU KEY
```

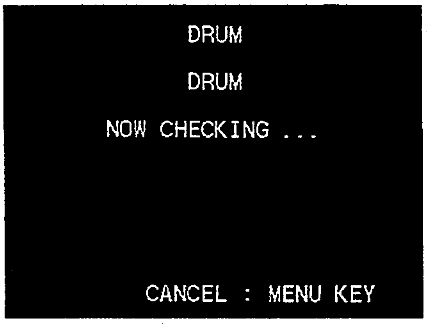

When detecting any error on a speed deviation.
Completed


```
        CAPSTAN

 CASTAN MOTOR SHAFT
        NO GOOD.




        NEXT :   (→) KEY
      CANCEL : MENU KEY
```


```
        CAPSTAN

        CAPSTAN
  CLEAN OR REPLACE.



        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL : MENU KEY
```

(12) DRUM Diagnosis


DRUM
NG
①
DRUM motor rotating check
OK
DRUM DRIVE waveform check

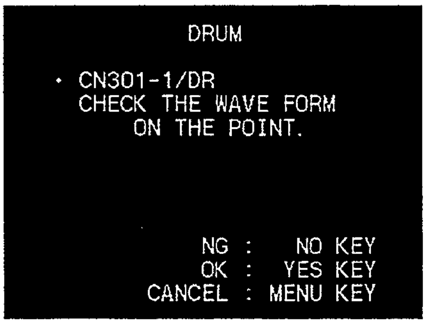

DRUM

DRUM

NOW CHECKING ...

CANCEL : MENU KEY

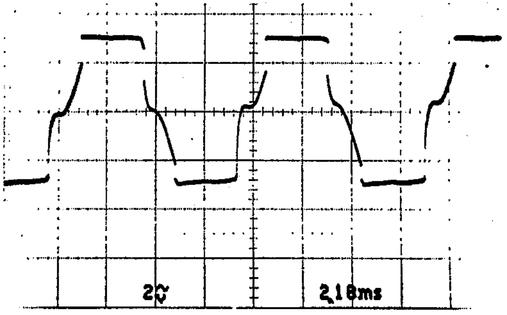
- The unit checks automatically.


DRUM

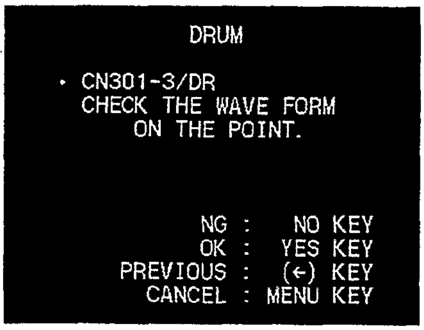
- CN301-1/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY

- CN301-1/DR-214 (C-5) waveform
  PB mode



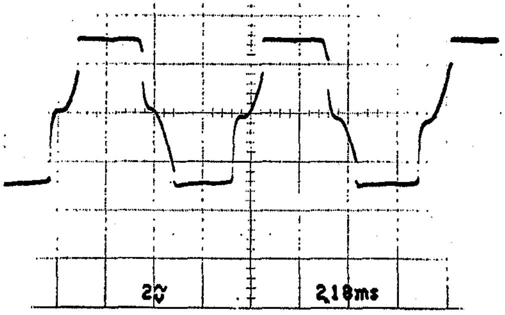
Continues to the next page.

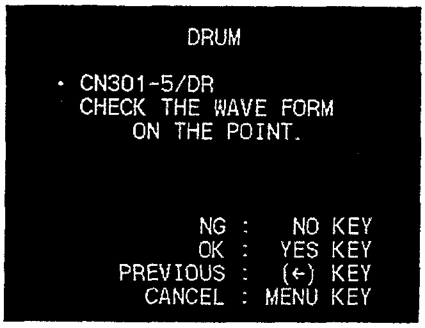

DRUM

- CN301-3/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-3/DR-214 (C-5) waveform
  PB mode

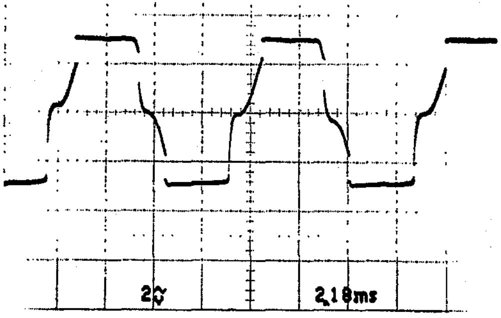


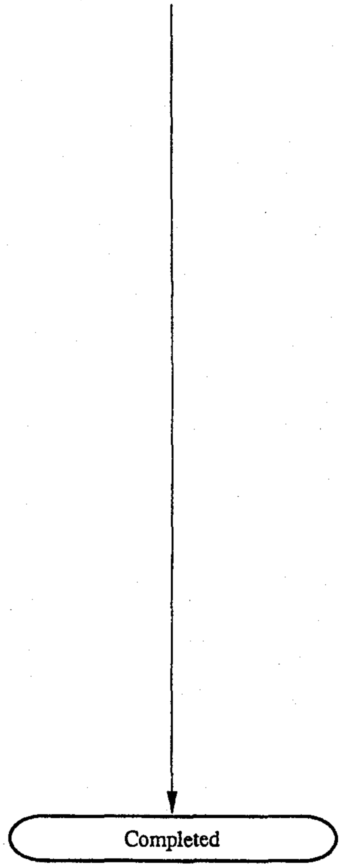

DRUM

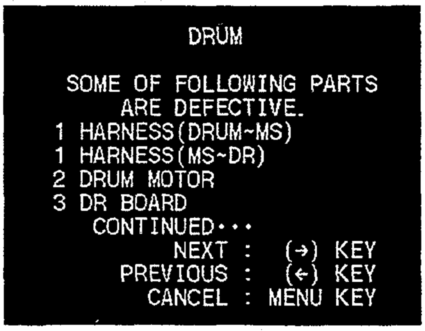
- CN301-5/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

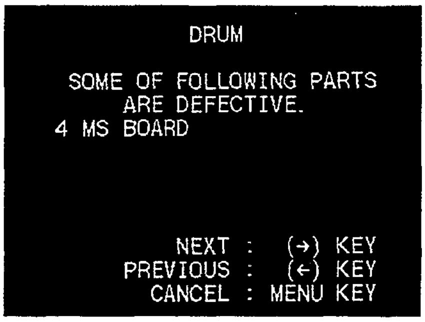
- CN301-5/DR-214 (C-5) waveform
  PB mode





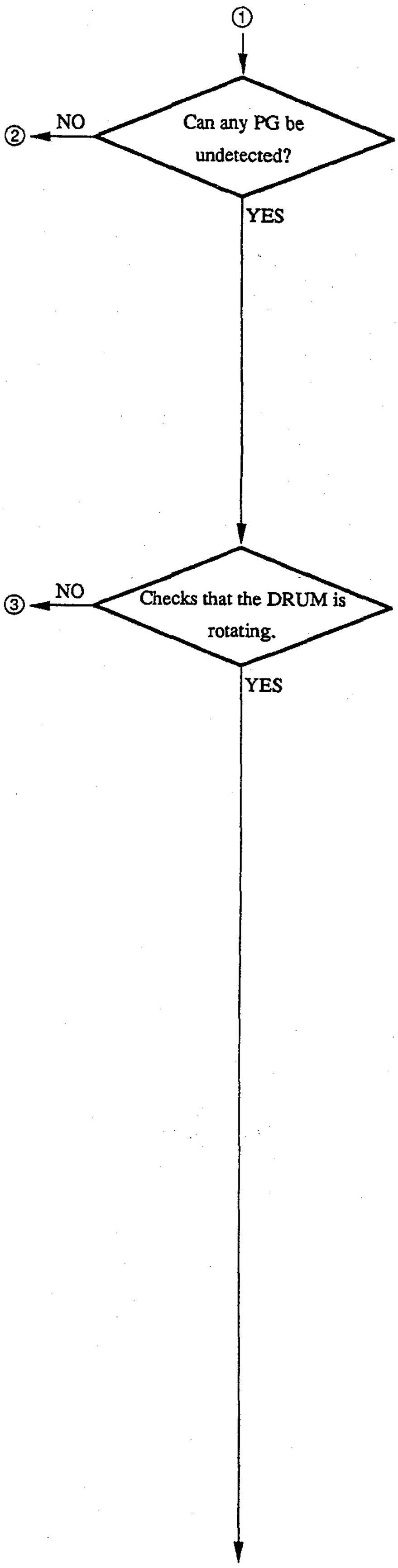


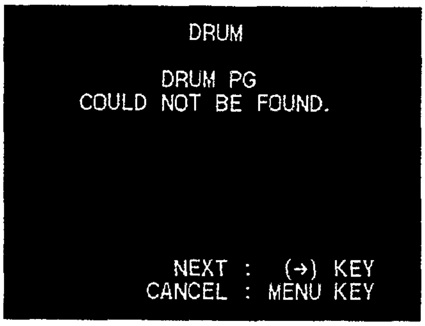
```
             DRUM

   SOME OF FOLLOWING PARTS
       ARE DEFECTIVE.
 1 HARNESS(DRUM~MS)
 1 HARNESS(MS~DR)
 2 DRUM MOTOR
 3 DR BOARD
    CONTINUED···
          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```



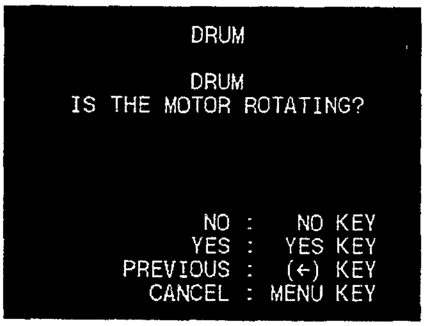
```
             DRUM

   SOME OF FOLLOWING PARTS
       ARE DEFECTIVE.
 4 MS BOARD




          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

- A drum might rotate unless the drum drive waveform is not normal. The drum might not rotate depending on the position after starting the drum.
  Check the connection between the drum and the DR board.


①
NO
②
Can any PG be undetected?
YES
NO
③
Checks that the DRUM is rotating.
YES



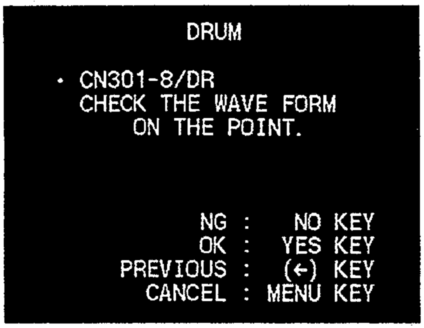
```
                DRUM

              DRUM PG
        COULD NOT BE FOUND.




                NEXT :   (→) KEY
              CANCEL : MENU KEY
```



```
                DRUM

                DRUM
        IS THE MOTOR ROTATING?



                  NO :    NO KEY
                 YES :   YES KEY
            PREVIOUS :   (←) KEY
              CANCEL :  MENU KEY
```

- Check that the DRUM motor is rotating or not.

Checks a PG input signal.

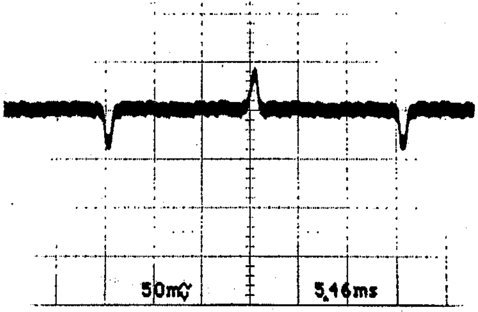


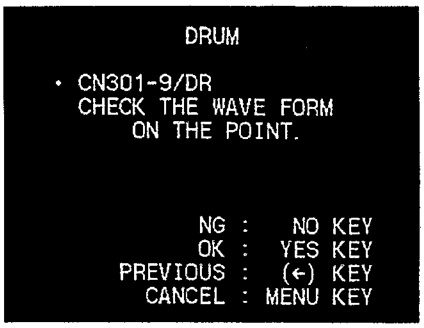
DRUM

- CN301-8/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-8/DR-214 (C-5) waveform
  PB mode



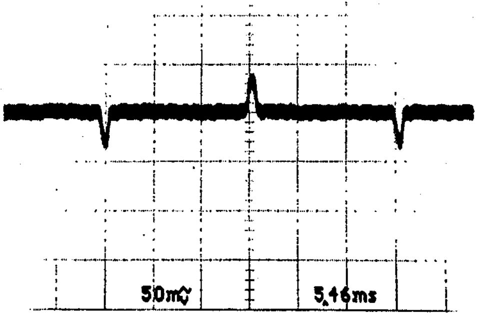


DRUM

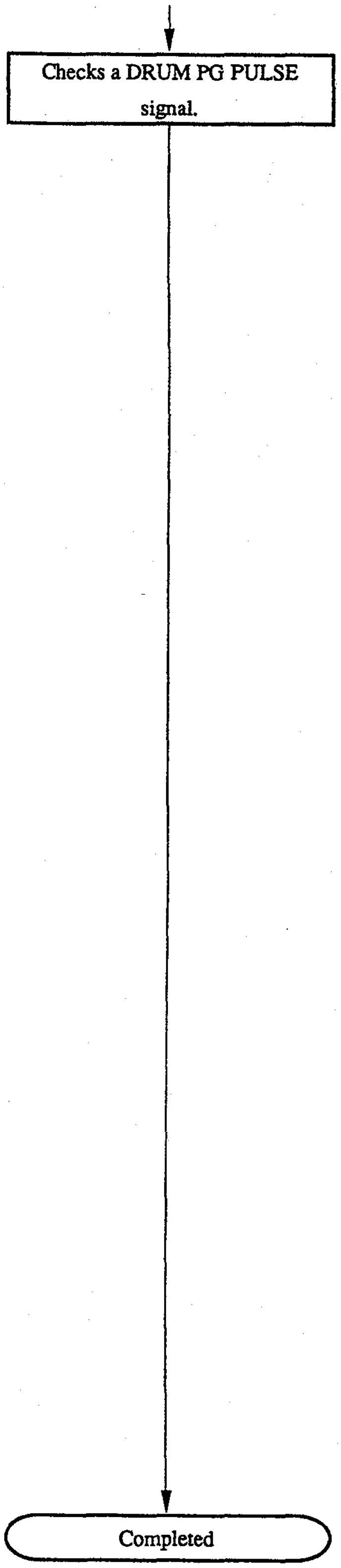
- CN301-9/DR
  CHECK THE WAVE FORM
  ON THE POINT.

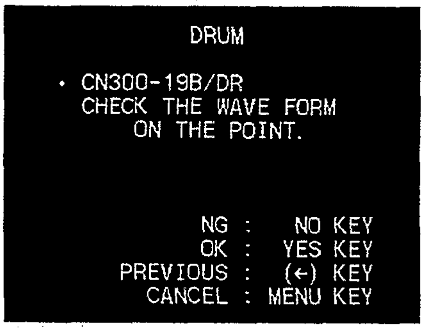
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-9/DR-214 (C-5) waveform
  PB mode

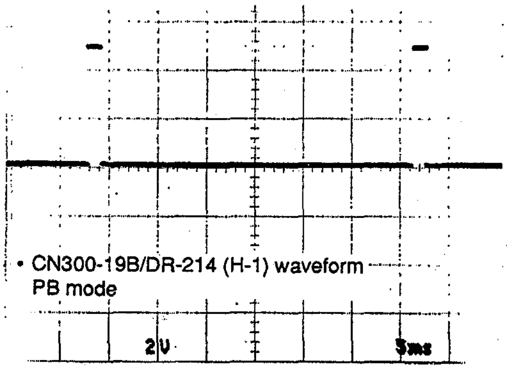


Continues to the next page.

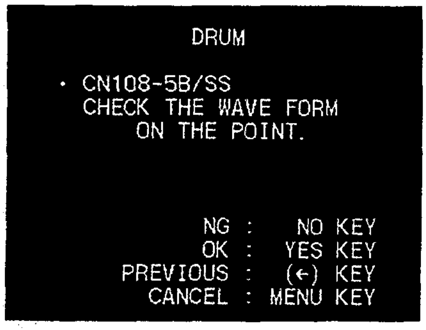

Checks a DRUM PG PULSE signal.
Completed



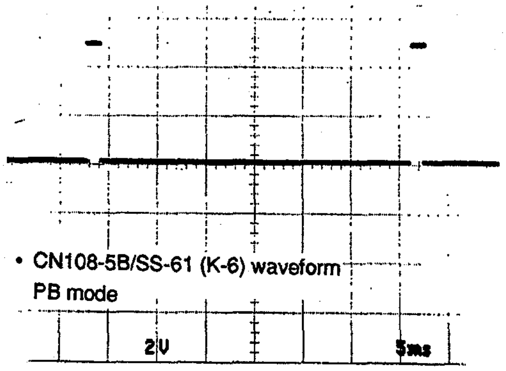
```
            DRUM

  • CN300-19B/DR
    CHECK THE WAVE FORM
        ON THE POINT.


                 NG :    NO KEY
                 OK :   YES KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```



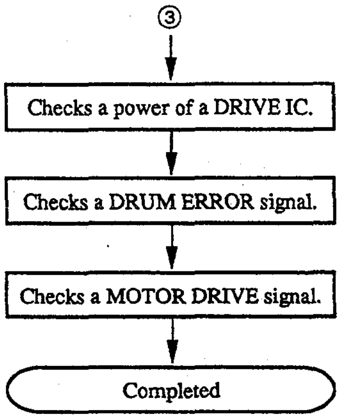
• CN300-19B/DR-214 (H-1) waveform
PB mode

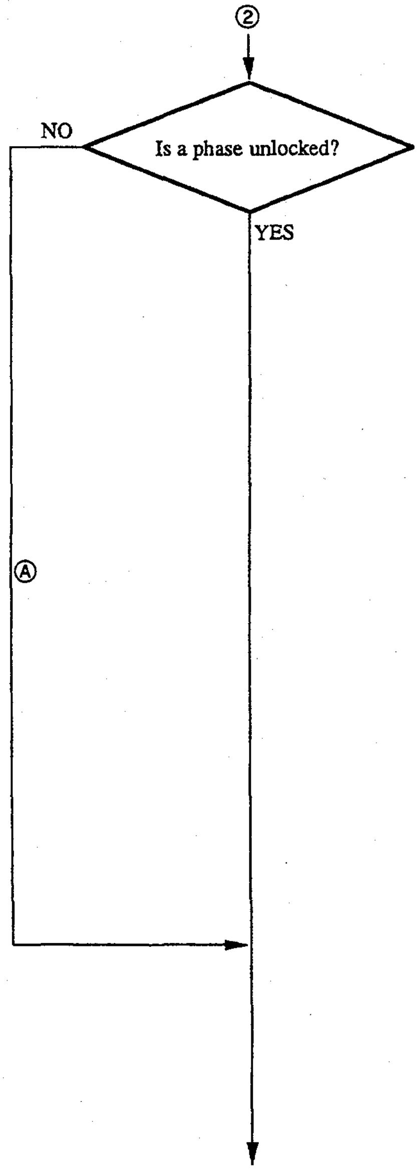


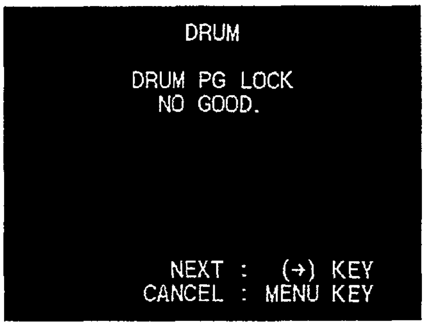
```
            DRUM

  • CN108-5B/SS
    CHECK THE WAVE FORM
        ON THE POINT.


                 NG :    NO KEY
                 OK :   YES KEY
           PREVIOUS :   (←) KEY
             CANCEL : MENU KEY
```



• CN108-5B/SS-61 (K-6) waveform
PB mode


③
Checks a power of a DRIVE IC.
Checks a DRUM ERROR signal.
Checks a MOTOR DRIVE signal.
Completed


②
Is a phase unlocked?
NO
YES
Ⓐ

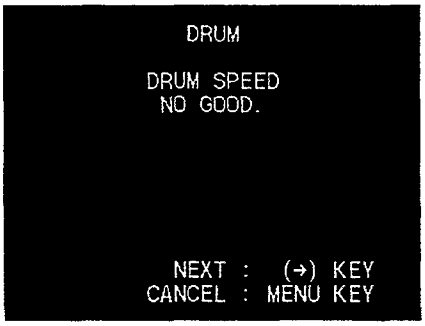


DRUM

DRUM PG LOCK
NO GOOD.

NEXT : (→) KEY
CANCEL : MENU KEY

Ⓐ



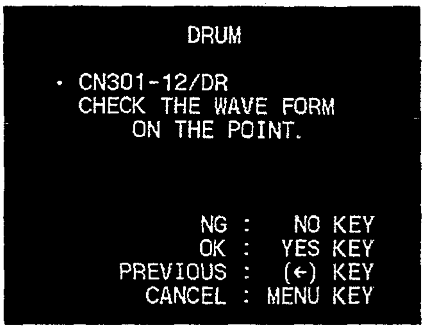
DRUM

DRUM SPEED
NO GOOD.

NEXT : (→) KEY
CANCEL : MENU KEY

Continues to the next page.

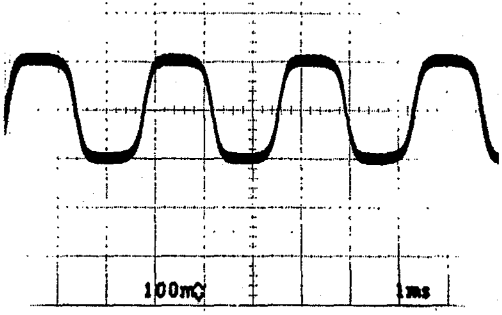
Checks a FG input signal.

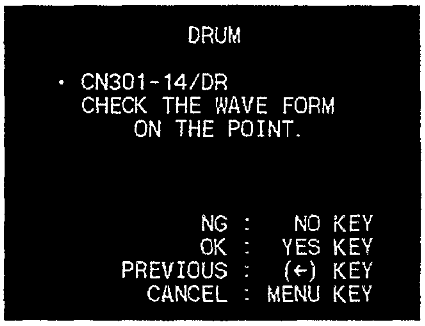

DRUM

- CN301-12/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-12/DR-214 (C-5) waveform
PB mode

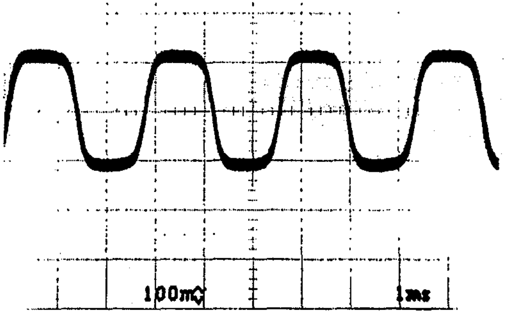


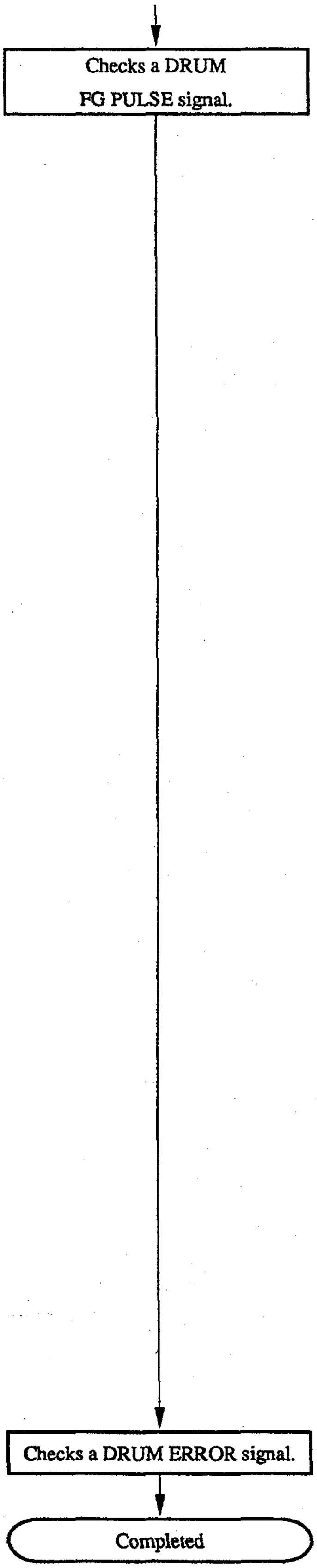

DRUM

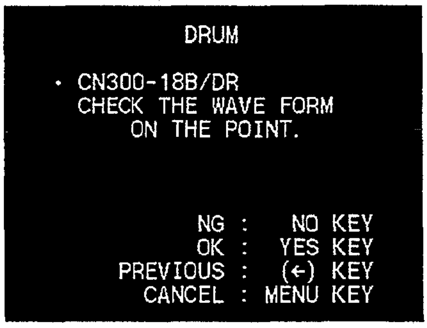
- CN301-14/DR
CHECK THE WAVE FORM
ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

- CN301-14/DR-214 (C-5) waveform
PB mode



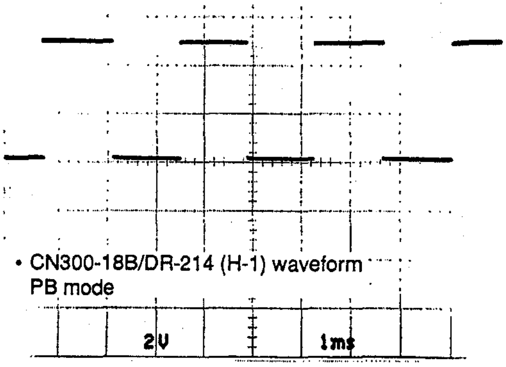

Checks a DRUM FG PULSE signal.
Checks a DRUM ERROR signal.
Completed



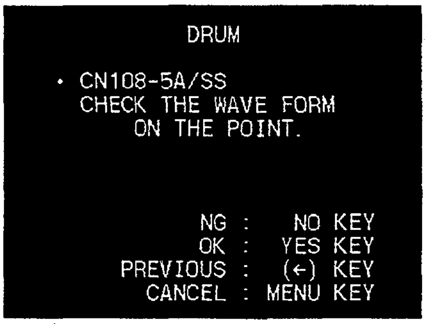
DRUM

- CN300-18B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



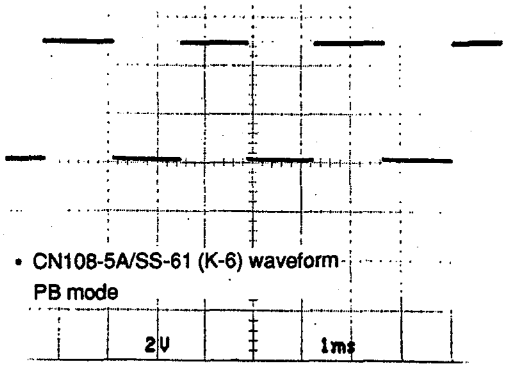
- CN300-18B/DR-214 (H-1) waveform
  PB mode



DRUM

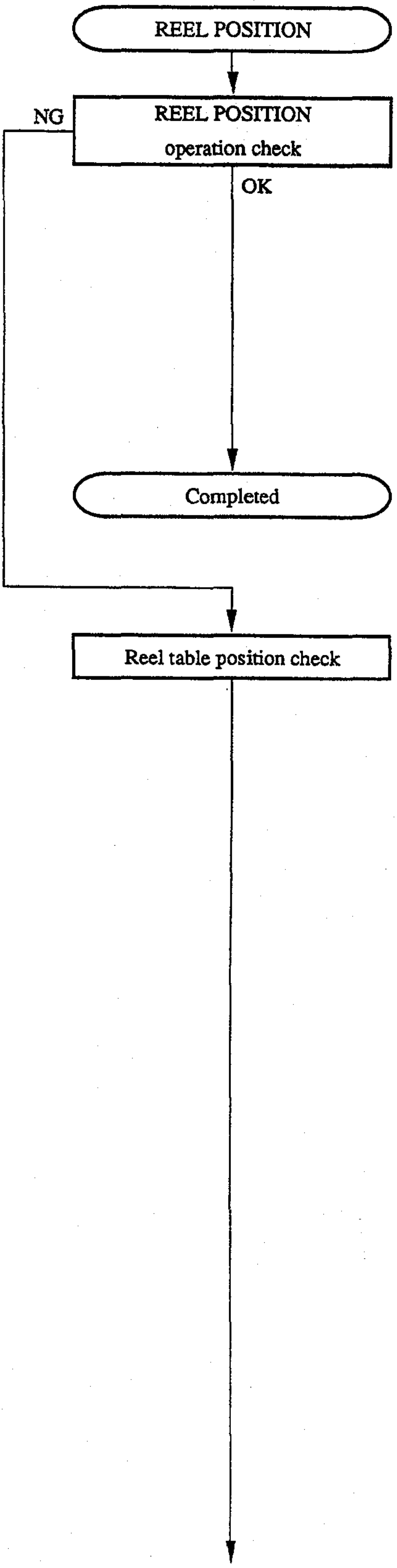
- CN108-5A/SS
  CHECK THE WAVE FORM
  ON THE POINT.

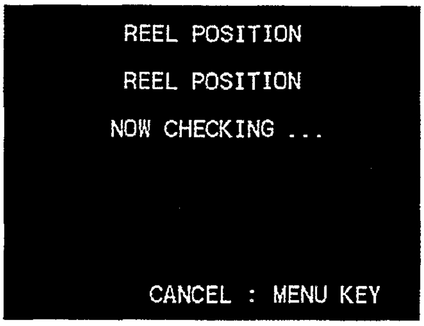
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



- CN108-5A/SS-61 (K-6) waveform
  PB mode

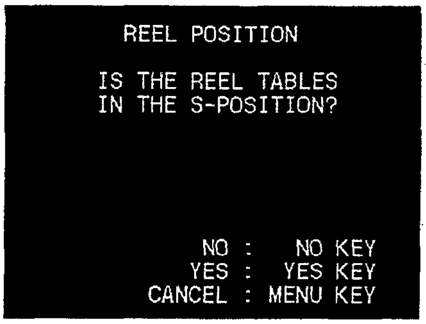
(13) REEL POSITION Diagnosis


REEL POSITION
NG
REEL POSITION operation check
OK
Completed
Reel table position check

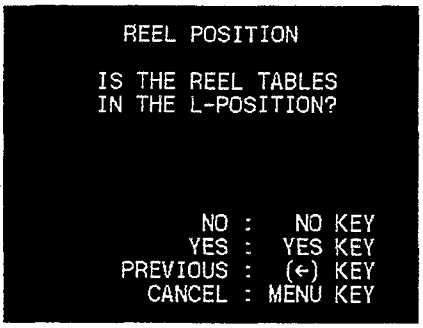


```
REEL POSITION
REEL POSITION
NOW CHECKING ...

CANCEL : MENU KEY
```

- The unit checks automatically.

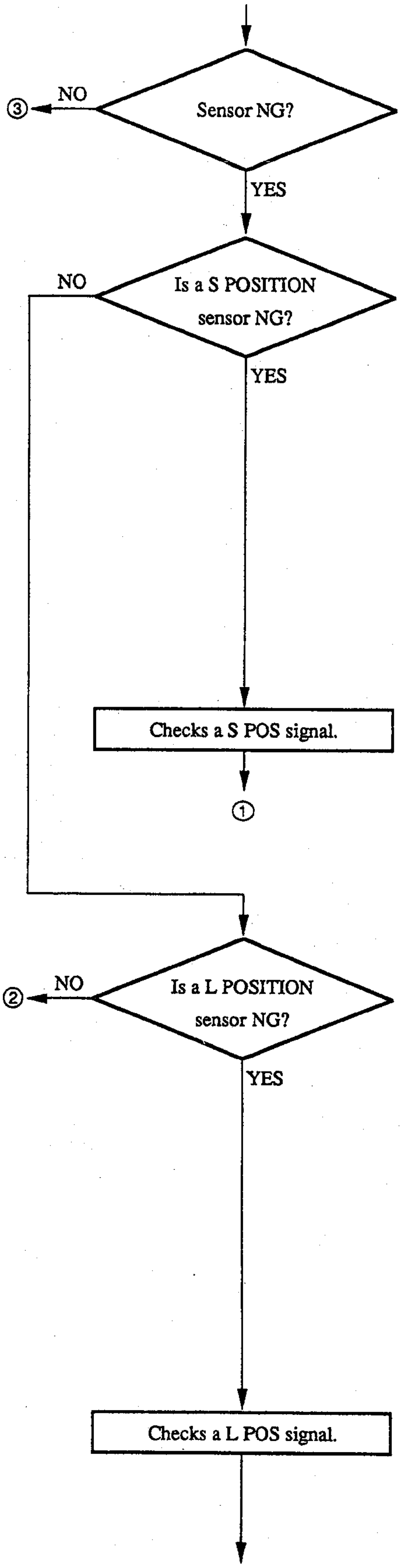


```
REEL POSITION
IS THE REEL TABLES
IN THE S-POSITION?

    NO :   NO KEY
   YES :  YES KEY
CANCEL : MENU KEY
```

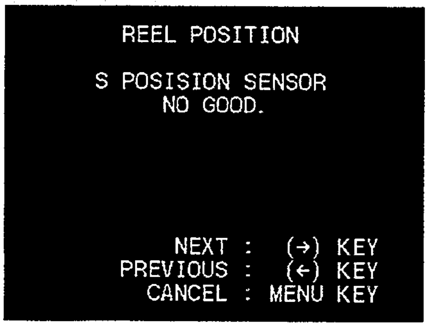


```
REEL POSITION
IS THE REEL TABLES
IN THE L-POSITION?

      NO :   NO KEY
     YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

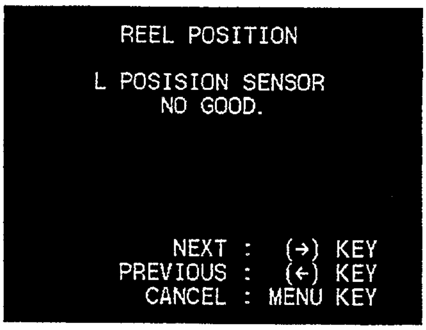
- Check the position of the reel table.


Sensor NG?
NO
③
YES
Is a S POSITION sensor NG?
NO
YES
Checks a S POS signal.
①
Is a L POSITION sensor NG?
NO
②
YES
Checks a L POS signal.

- From the condition of sensors and the result of the Reel Table Position Check, the unit decides that the sensors are NG or not.



```
      REEL POSITION

   S POSISION SENSOR
        NO GOOD.




        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL :  MENU KEY
```

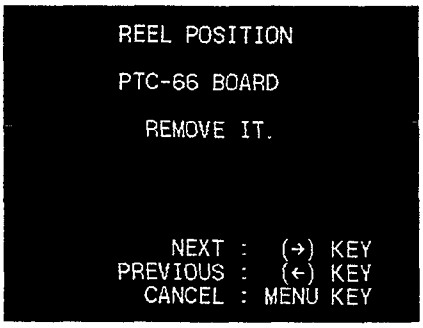


```
      REEL POSITION

   L POSISION SENSOR
        NO GOOD.




        NEXT :   (→) KEY
    PREVIOUS :   (←) KEY
      CANCEL :  MENU KEY
```

Continues to the next page.

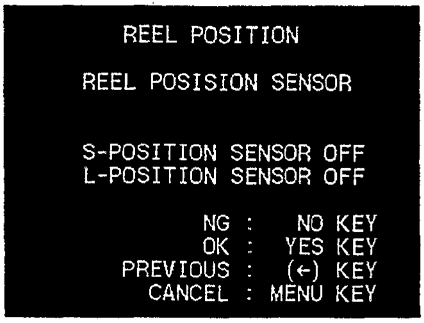
①

Checks each sensor.



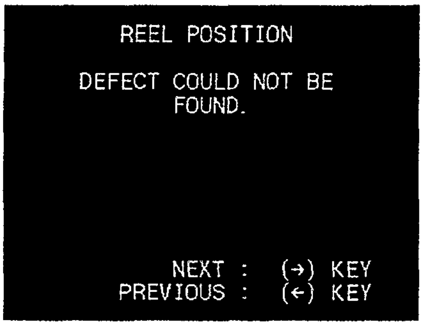
```
     REEL POSITION

     PTC-66 BOARD

       REMOVE IT.




          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
        CANCEL : MENU KEY
```

- Stop the diagnosis and turn off the power. Remove the PTC-66 board from the unit.
  Then, turn on the power while harnesses are connected.



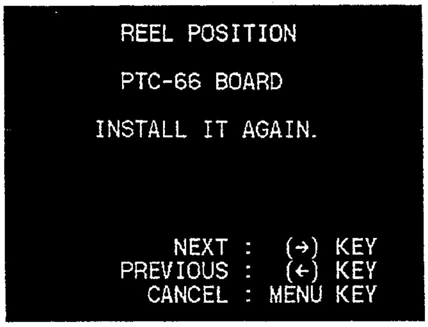
```
       REEL POSITION

   REEL POSISION SENSOR


   S-POSITION SENSOR OFF
   L-POSITION SENSOR OFF

                NG :   NO KEY
                OK :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

- Check that the display shows OFF.
  Then, check that the display shows ON when the sensor is obstructed by something to cut off a beam of light such as a sheet of black paper.



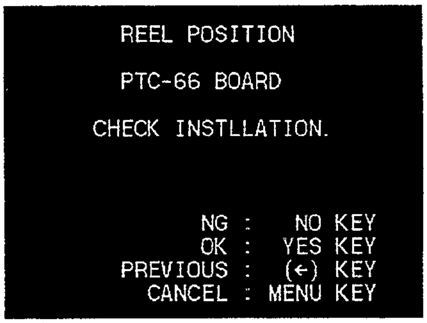
```
      REEL POSITION

   DEFECT COULD NOT BE
         FOUND.






          NEXT :   (→) KEY
      PREVIOUS :   (←) KEY
```

- The probable cause is the faulty connections of harnesses and so on.



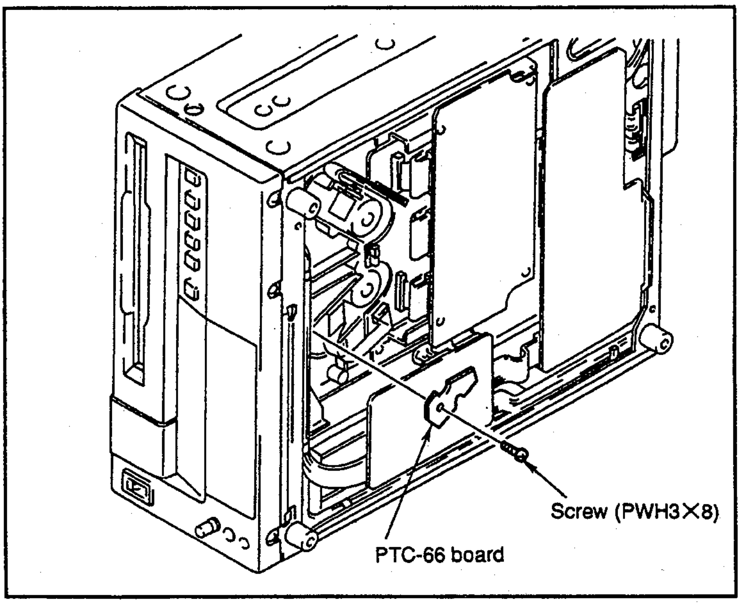
```
REEL POSITION

PTC-66 BOARD

INSTALL IT AGAIN.



     NEXT :  (→) KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

- Stop the diagnosis and turn off the power. Then, install the removed PTC-66 board.



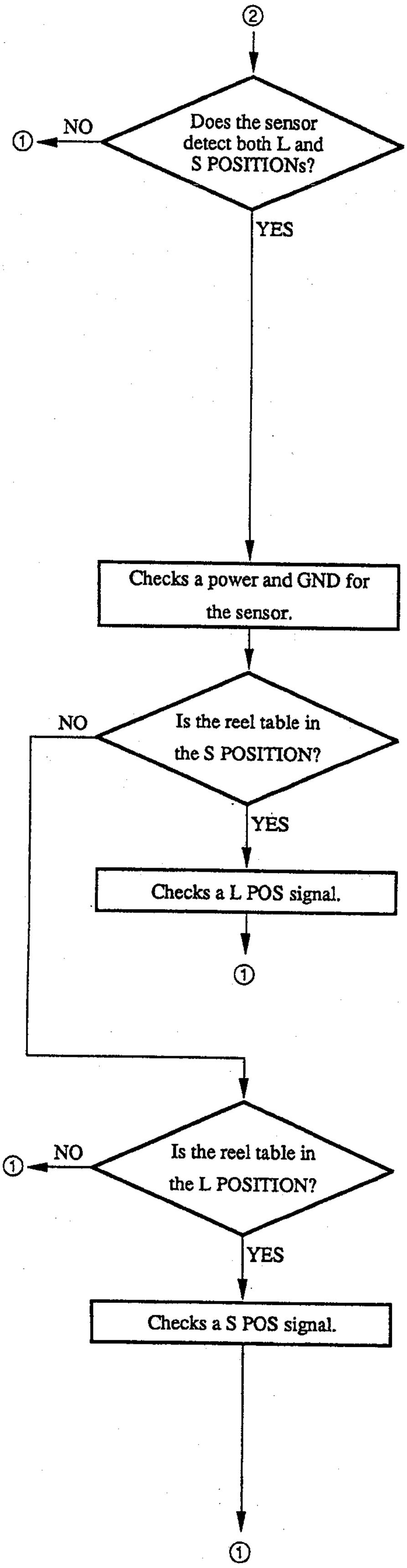
```
REEL POSITION

PTC-66 BOARD

CHECK INSTLLATION.



       NG :   NO KEY
       OK :  YES KEY
 PREVIOUS :  (←) KEY
   CANCEL : MENU KEY
```

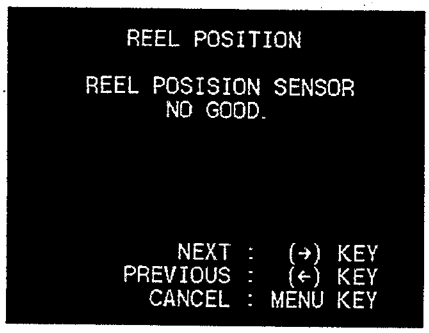
- Install the PTC-66 board.



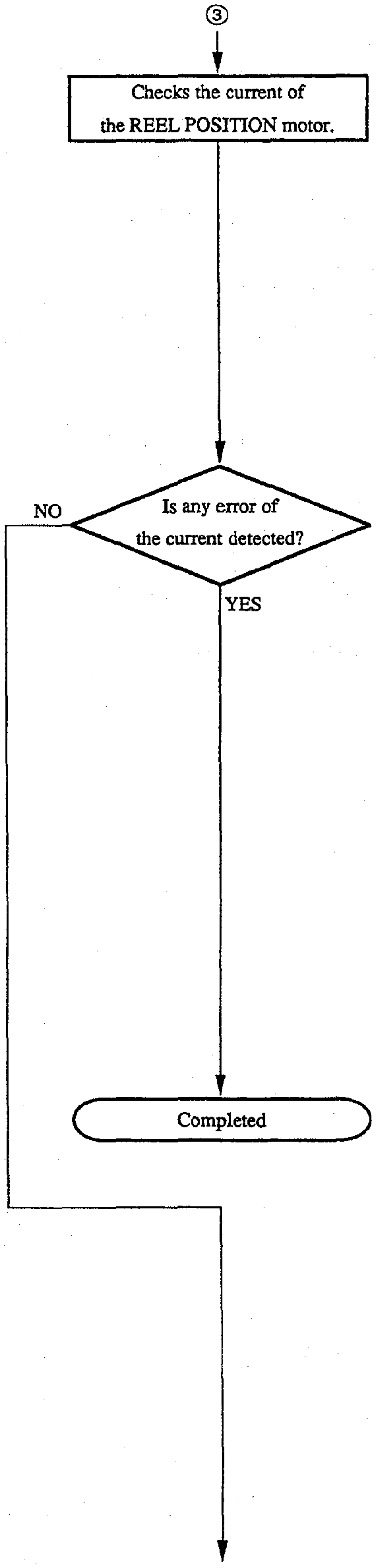
Check : The screw with fixing the board should be tightened.
There should not be clearance between the PTC-66 board and the mechanical parts.

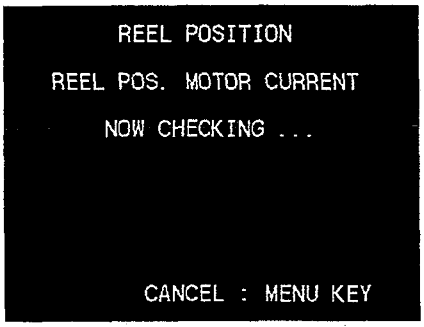
Completed


②
Does the sensor detect both L and S POSITIONs?
NO
①
YES
Checks a power and GND for the sensor.
Is the reel table in the S POSITION?
NO
YES
Checks a L POS signal.
①
Is the reel table in the L POSITION?
NO
①
YES
Checks a S POS signal.
①



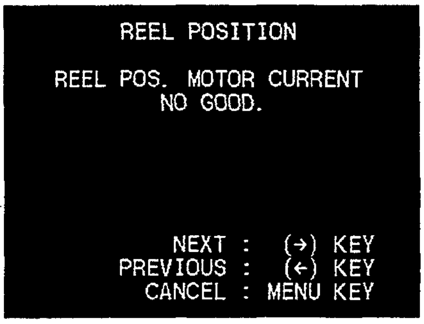
```
         REEL POSITION

     REEL POSISION SENSOR
            NO GOOD.




         NEXT :   (→) KEY
     PREVIOUS :   (←) KEY
       CANCEL : MENU KEY
```


③
Checks the current of the REEL POSITION motor.
Is any error of the current detected?
NO
YES
Completed

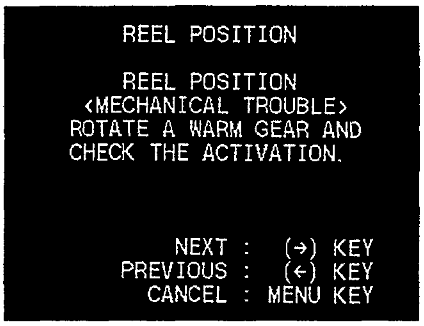


```
REEL POSITION
REEL POS. MOTOR CURRENT
NOW CHECKING ...

CANCEL : MENU KEY
```

- The unit checks automatically.

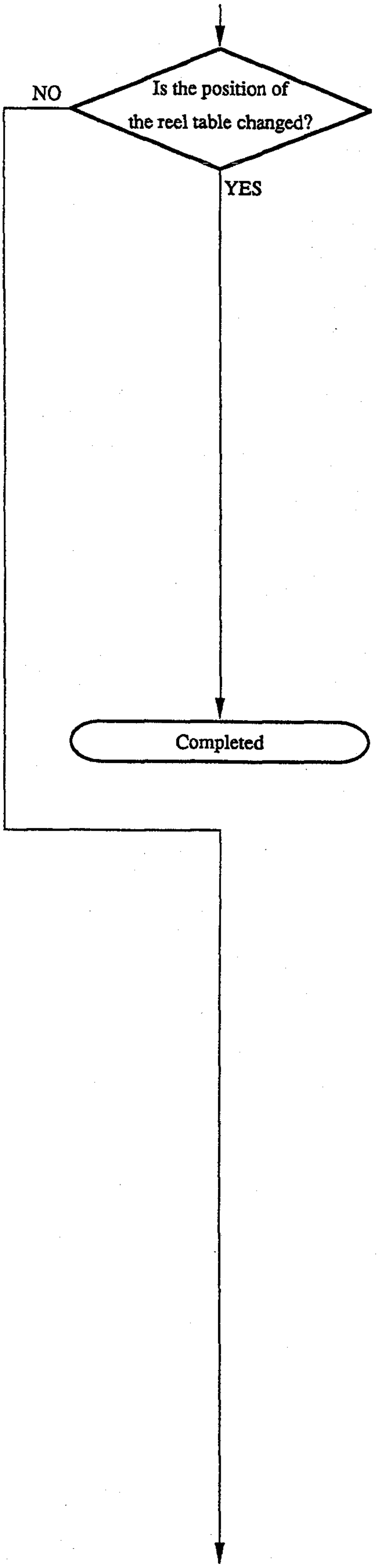


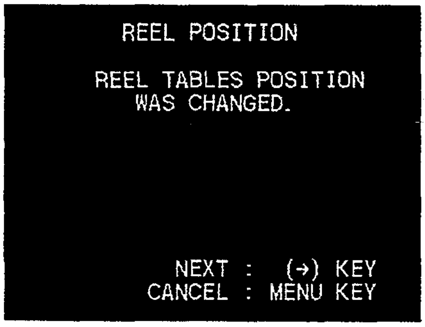
```
REEL POSITION
REEL POS. MOTOR CURRENT
NO GOOD.

    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```



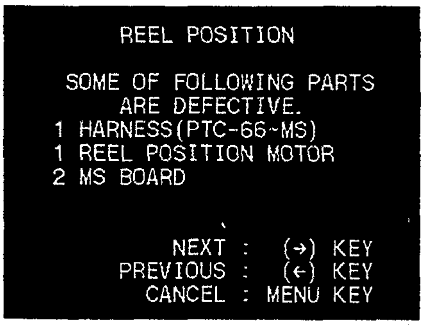
```
REEL POSITION
REEL POSITION
<MECHANICAL TROUBLE>
ROTATE A WARM GEAR AND
CHECK THE ACTIVATION.

    NEXT :  (→) KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

Continues to the next page.


NO
Is the position of the reel table changed?
YES
Completed

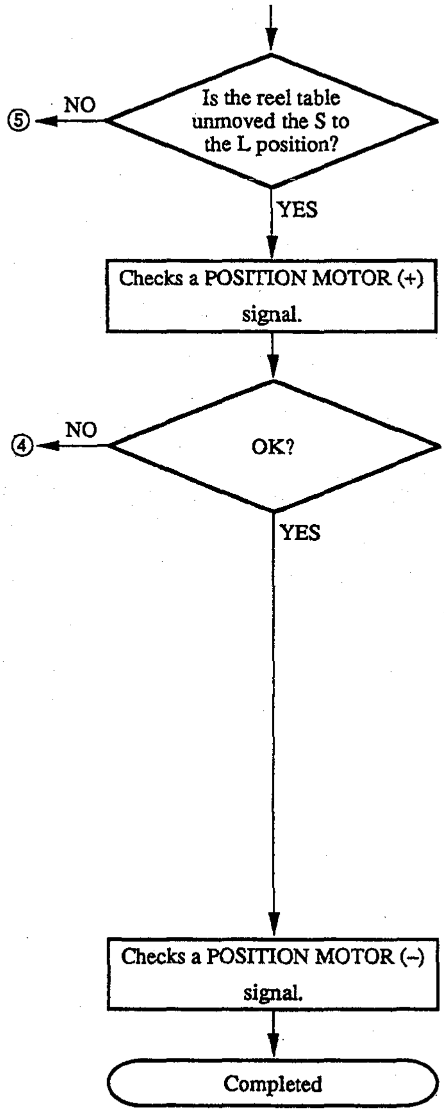


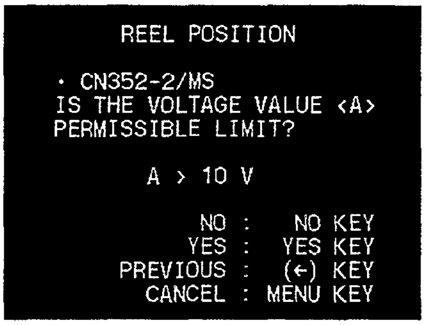
```
        REEL POSITION

     REEL TABLES POSITION
        WAS CHANGED.





             NEXT :  (→) KEY
           CANCEL : MENU KEY
```



```
        REEL POSITION

   SOME OF FOLLOWING PARTS
       ARE DEFECTIVE.
  1 HARNESS(PTC-66-MS)
  1 REEL POSITION MOTOR
  2 MS BOARD

             NEXT :  (→) KEY
         PREVIOUS :  (←) KEY
           CANCEL : MENU KEY
```

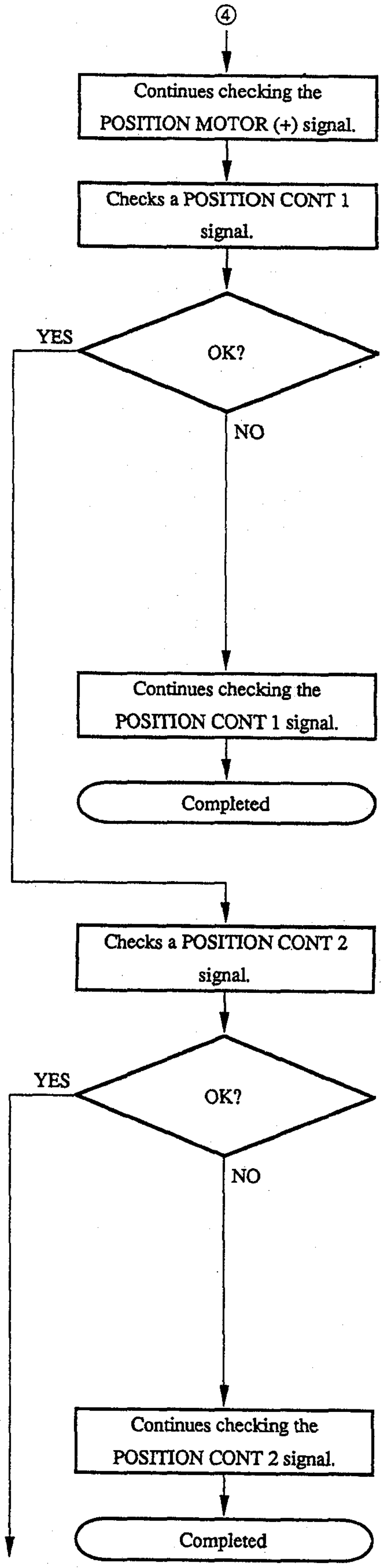
- The probable cause is the faulty connections of harnesses and so on.

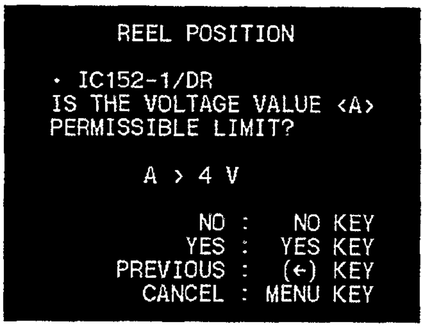

Is the reel table unmoved the S to the L position?
NO
⑤
YES
Checks a POSITION MOTOR (+) signal.
OK?
NO
④
YES
Checks a POSITION MOTOR (–) signal.
Completed



```
          REEL POSITION

   • CN352-2/MS
   IS THE VOLTAGE VALUE <A>
   PERMISSIBLE LIMIT?

            A > 10 V

                NO :   NO KEY
               YES :  YES KEY
          PREVIOUS :  (←) KEY
            CANCEL : MENU KEY
```

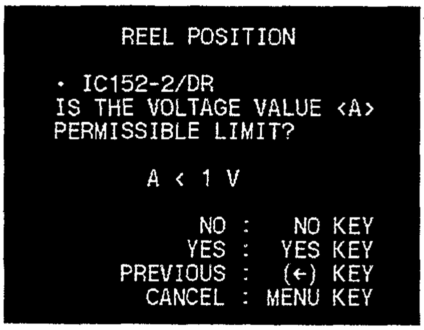
- CN352/MS-39 (F-1)


④
Continues checking the POSITION MOTOR (+) signal.
Checks a POSITION CONT 1 signal.
OK?
YES
NO
Continues checking the POSITION CONT 1 signal.
Completed
Checks a POSITION CONT 2 signal.
OK?
YES
NO
Continues checking the POSITION CONT 2 signal.
Completed



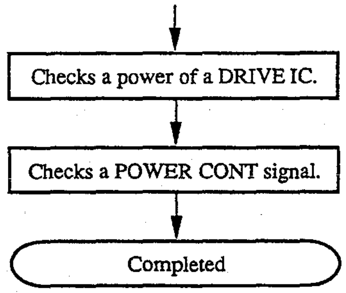
```
        REEL POSITION

 · IC152-1/DR
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

       A > 4 V

          NO :   NO KEY
         YES :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

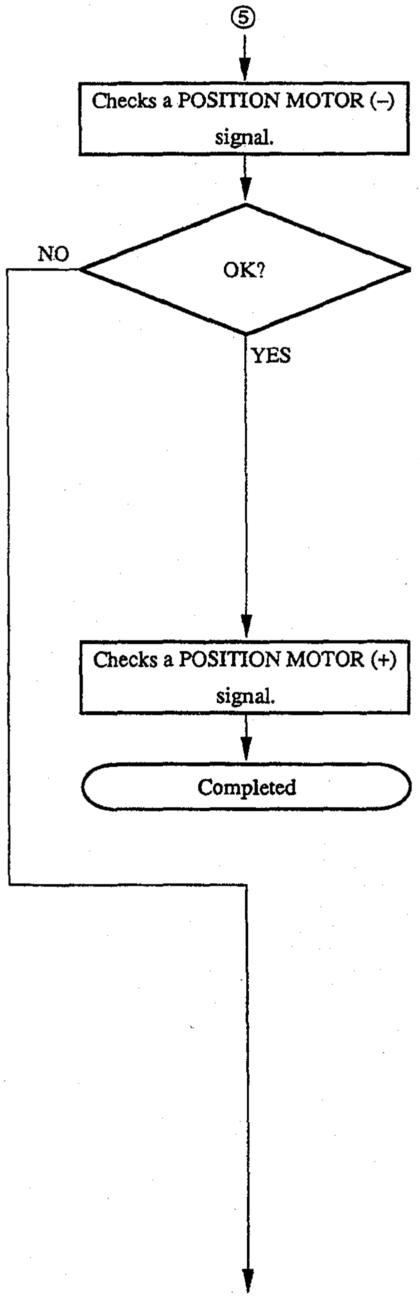
- IC152/DR-214 (L-4)

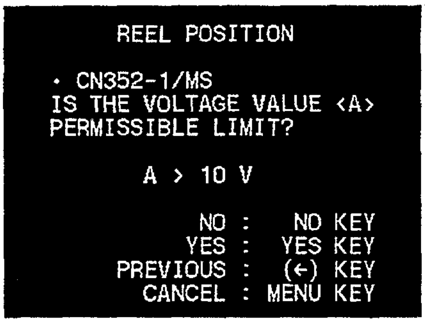


```
        REEL POSITION

 · IC152-2/DR
IS THE VOLTAGE VALUE <A>
PERMISSIBLE LIMIT?

       A < 1 V

          NO :   NO KEY
         YES :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

- IC152/DR-214 (L-4)


Checks a power of a DRIVE IC.
Checks a POWER CONT signal.
Completed

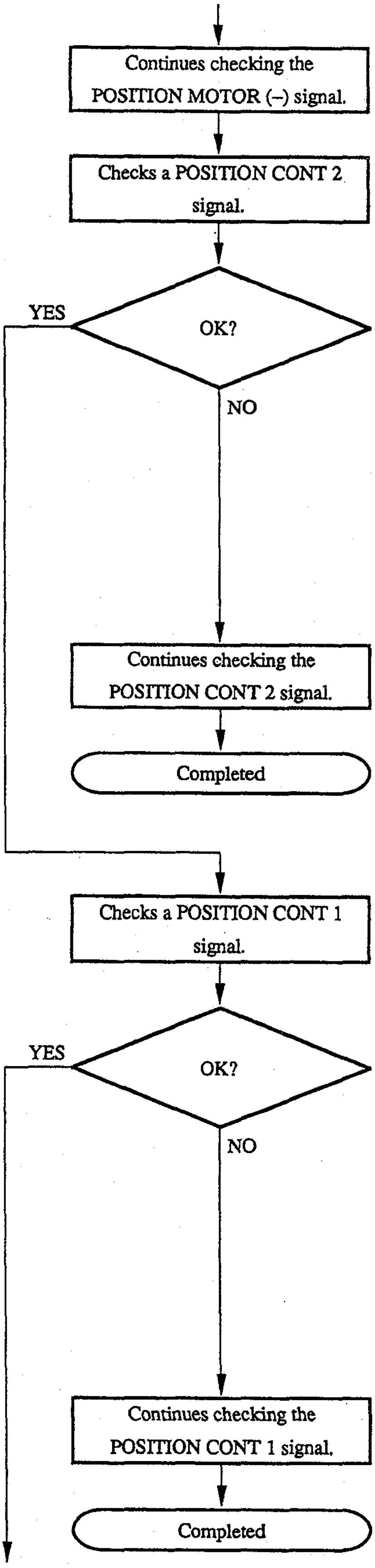

⑤
Checks a POSITION MOTOR (–) signal.
OK?
NO
YES
Checks a POSITION MOTOR (+) signal.
Completed

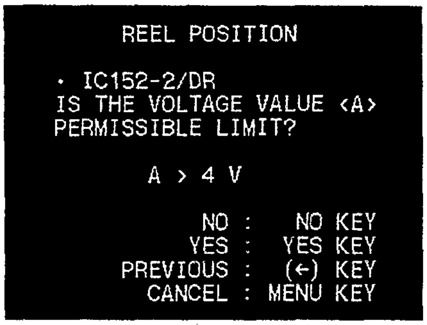


```
        REEL POSITION

 • CN352-1/MS
 IS THE VOLTAGE VALUE <A>
 PERMISSIBLE LIMIT?

          A > 10 V

            NO :   NO KEY
           YES :  YES KEY
      PREVIOUS :  (←) KEY
        CANCEL : MENU KEY
```

- CN352/MS-39 (F-1)

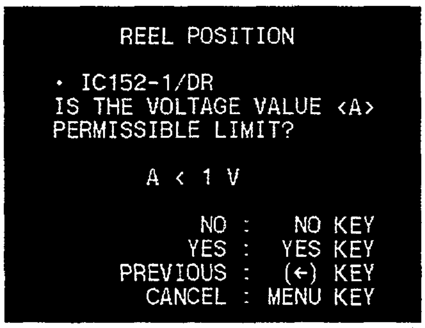
Continues to the next page.


Continues checking the POSITION MOTOR (–) signal.
Checks a POSITION CONT 2 signal.
YES
OK?
NO
Continues checking the POSITION CONT 2 signal.
Completed
Checks a POSITION CONT 1 signal.
YES
OK?
NO
Continues checking the POSITION CONT 1 signal.
Completed



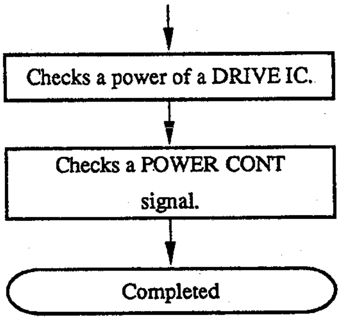
```
          REEL POSITION

  • IC152-2/DR
  IS THE VOLTAGE VALUE <A>
  PERMISSIBLE LIMIT?

          A > 4 V

              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- IC152/DR-214 (L-4)

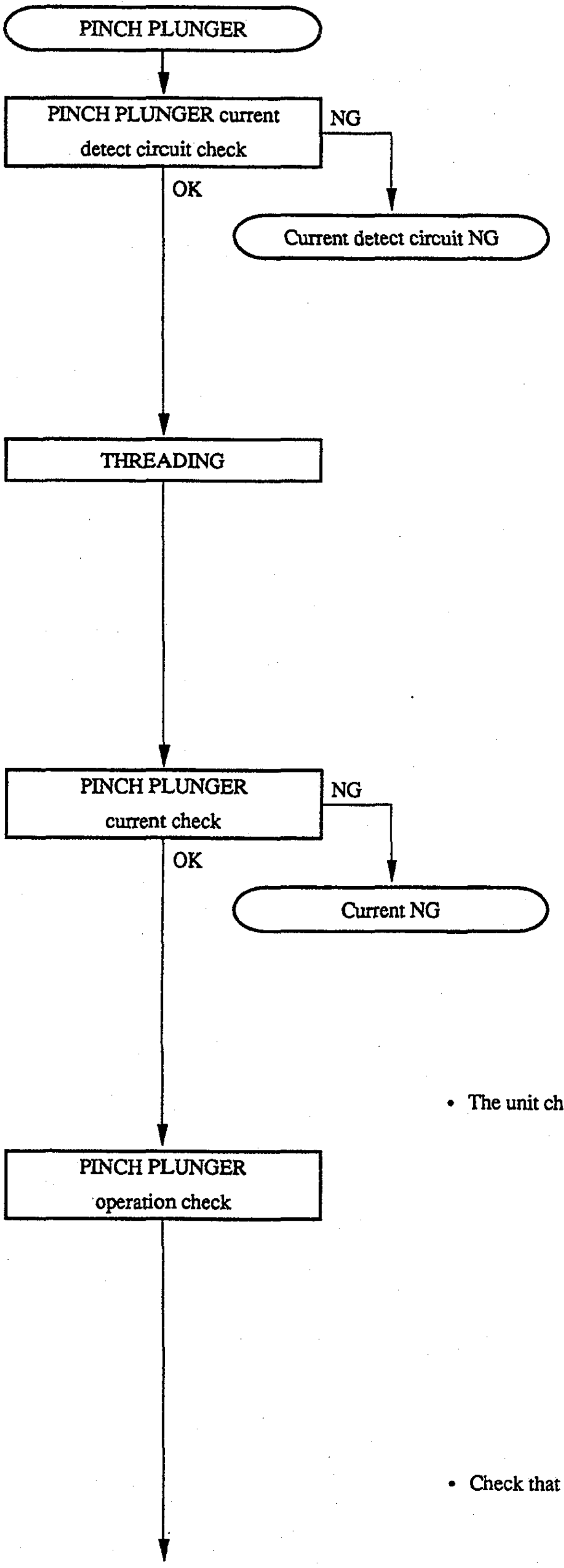


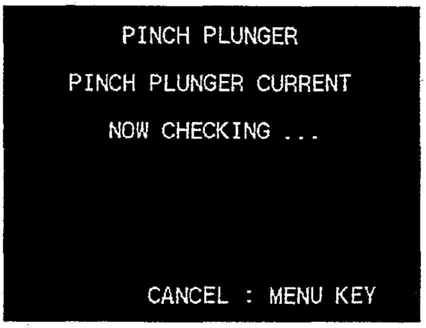
```
          REEL POSITION

  • IC152-1/DR
  IS THE VOLTAGE VALUE <A>
  PERMISSIBLE LIMIT?

          A < 1 V

              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- IC152/DR-214 (L-4)

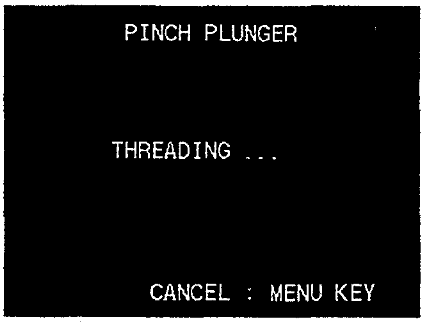

Checks a power of a DRIVE IC.
Checks a POWER CONT signal.
Completed

(14) PINCH PLUNGER Diagnosis

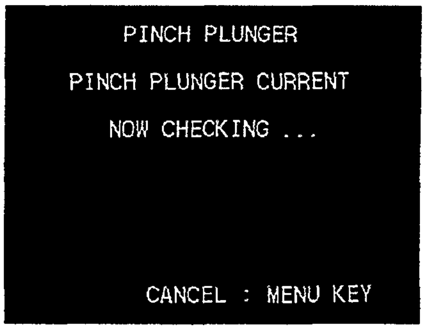

PINCH PLUNGER
PINCH PLUNGER current detect circuit check
NG
OK
Current detect circuit NG
THREADING
PINCH PLUNGER current check
NG
OK
Current NG
PINCH PLUNGER operation check



```
PINCH PLUNGER
PINCH PLUNGER CURRENT
NOW CHECKING ...

CANCEL : MENU KEY
```

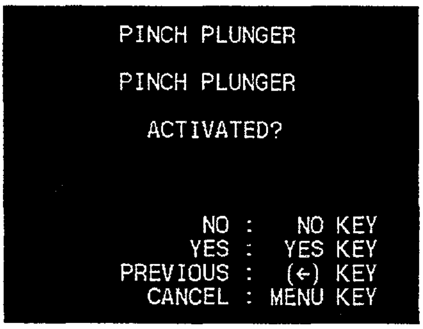


```
PINCH PLUNGER

THREADING ...

CANCEL : MENU KEY
```



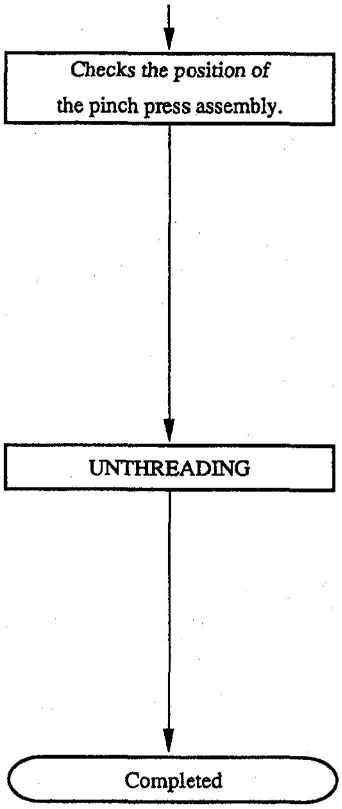
```
PINCH PLUNGER
PINCH PLUNGER CURRENT
NOW CHECKING ...

CANCEL : MENU KEY
```

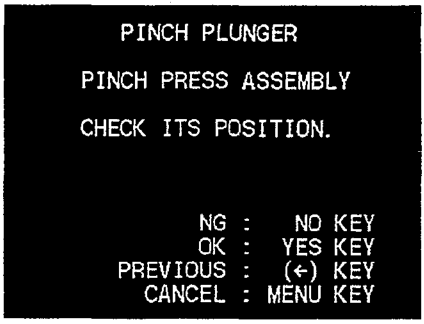
- The unit checks automatically.



```
PINCH PLUNGER
PINCH PLUNGER
ACTIVATED?

      NO :   NO KEY
     YES :  YES KEY
PREVIOUS :  (←) KEY
  CANCEL : MENU KEY
```

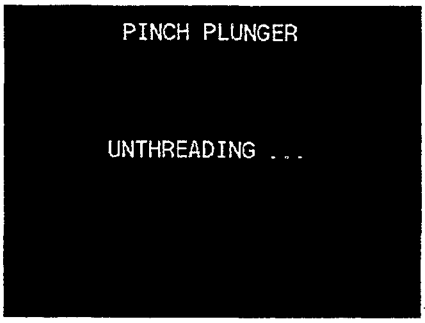
- Check that the pinch plunger is ON and against the capstan motor.


Checks the position of the pinch press assembly.
UNTHREADING
Completed

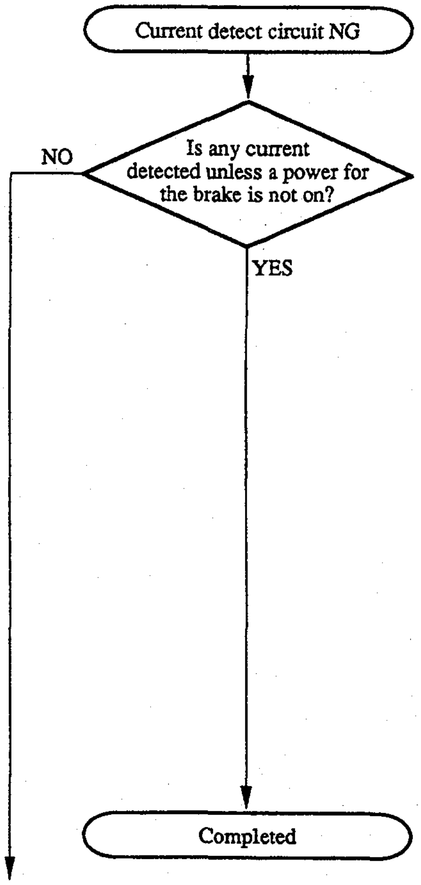


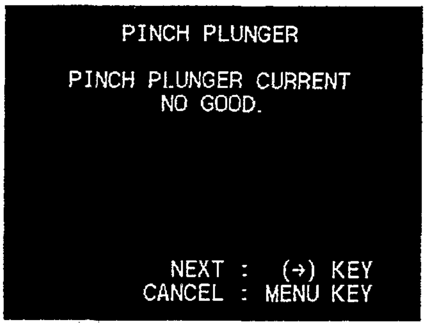
```
PINCH PLUNGER

PINCH PRESS ASSEMBLY

CHECK ITS POSITION.


          NG :   NO KEY
          OK :  YES KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

- Refer to section 6-17-1 in Service Manual Vol. 1.

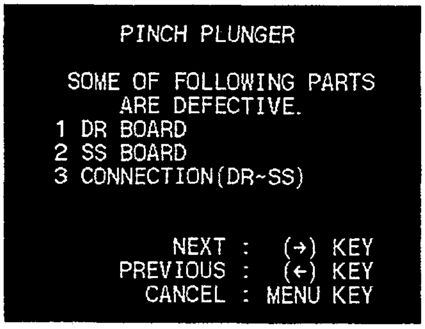


```
PINCH PLUNGER



UNTHREADING ...
```


Current detect circuit NG
Is any current detected unless a power for the brake is not on?
NO
YES
Completed



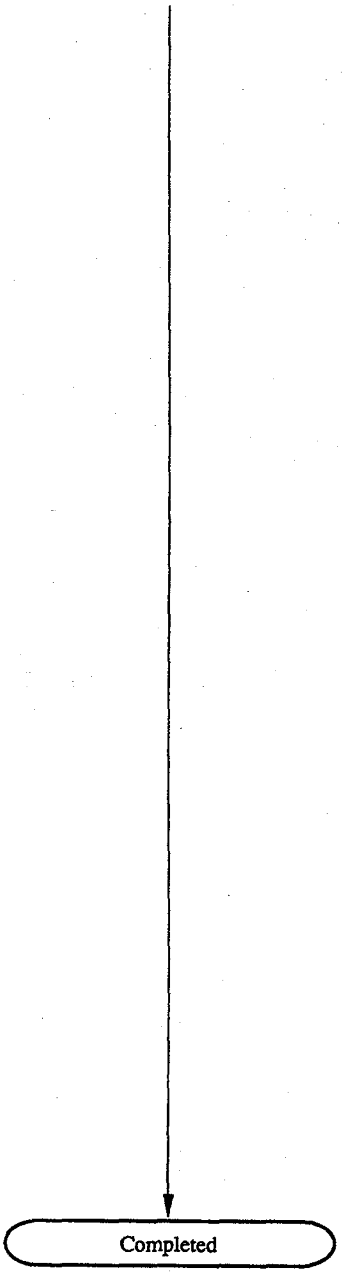
```
PINCH PLUNGER

PINCH PLUNGER CURRENT
      NO GOOD.




        NEXT :  (→) KEY
      CANCEL : MENU KEY
```

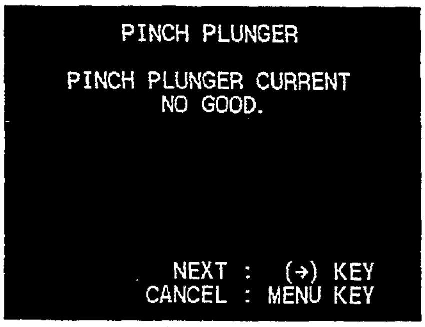


```
PINCH PLUNGER

SOME OF FOLLOWING PARTS
    ARE DEFECTIVE.
1 DR BOARD
2 SS BOARD
3 CONNECTION(DR~SS)

        NEXT :  (→) KEY
    PREVIOUS :  (←) KEY
      CANCEL : MENU KEY
```

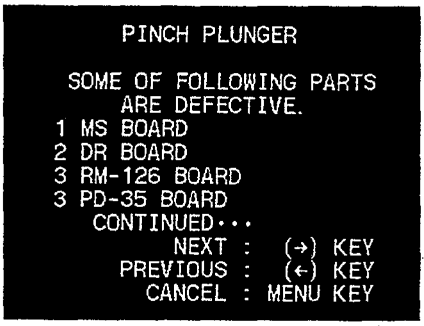
- The probable cause is that the current detect circuit is defective.

Continues to the next page.

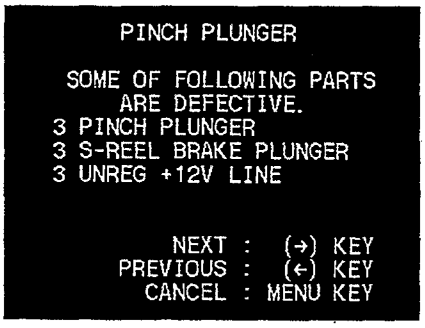




```
PINCH PLUNGER

PINCH PLUNGER CURRENT
NO GOOD.




NEXT  :  (→) KEY
CANCEL : MENU KEY
```

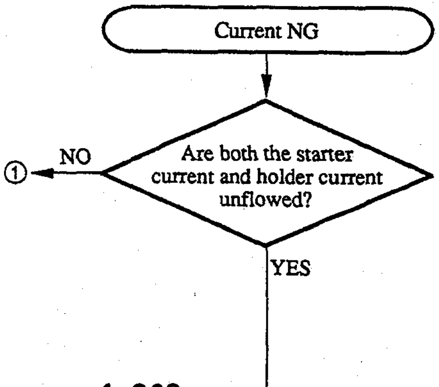


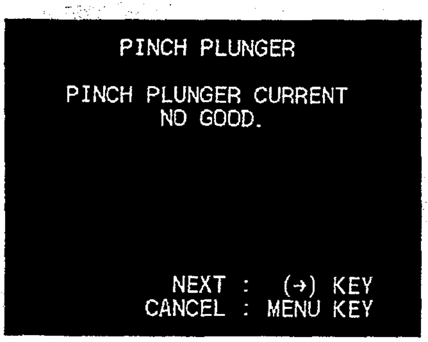
```
PINCH PLUNGER

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
1 MS BOARD
2 DR BOARD
3 RM-126 BOARD
3 PD-35 BOARD
CONTINUED···
    NEXT  :  (→) KEY
PREVIOUS  :  (←) KEY
  CANCEL  : MENU KEY
```



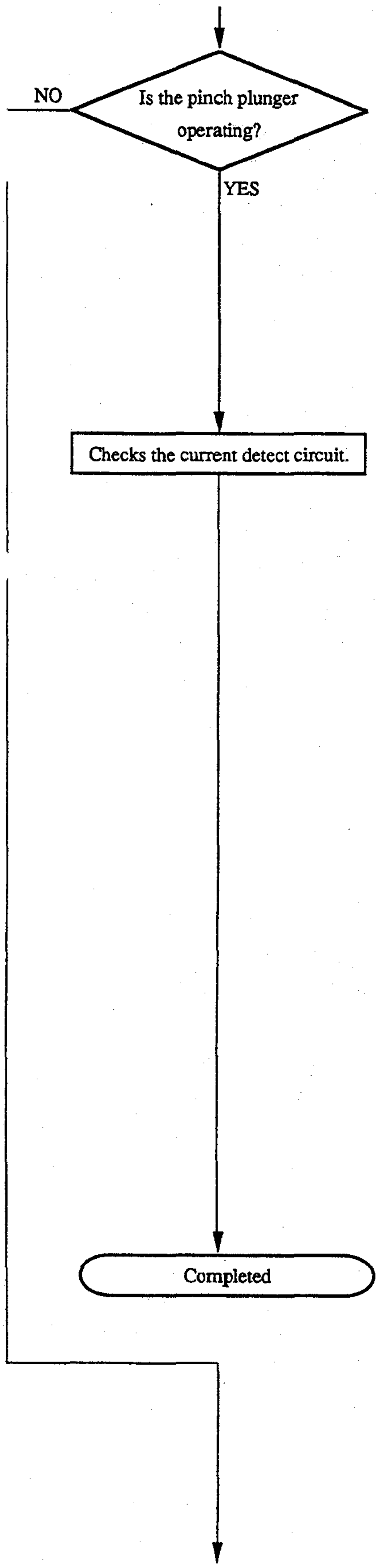
```
PINCH PLUNGER

SOME OF FOLLOWING PARTS
ARE DEFECTIVE.
3 PINCH PLUNGER
3 S-REEL BRAKE PLUNGER
3 UNREG +12V LINE

    NEXT  :  (→) KEY
PREVIOUS  :  (←) KEY
  CANCEL  : MENU KEY
```

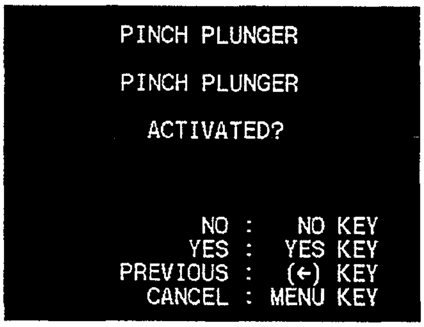
- The probable cause is that any current is flowed by the cause such as a shorting of the signal line.
  The other cause is that the S REEL BRAKE system is defective because the current detect circuit is used for both the PINCH PLUNGER and the S REEL BRAKE.


Current NG
Are both the starter current and holder current unflowed?
NO
①
YES



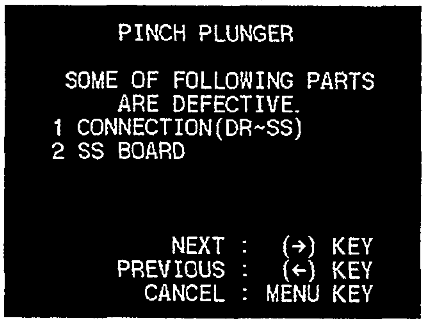
```
PINCH PLUNGER

PINCH PLUNGER CURRENT
NO GOOD.




NEXT  :  (→) KEY
CANCEL : MENU KEY
```


NO
Is the pinch plunger operating?
YES
Checks the current detect circuit.
Completed



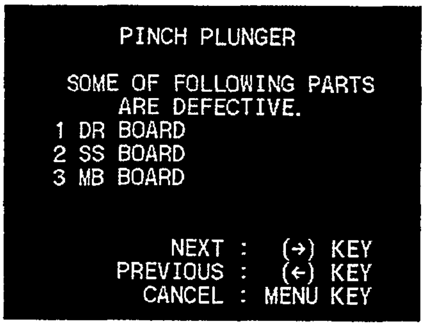
```
      PINCH PLUNGER

      PINCH PLUNGER

        ACTIVATED?



           NO :   NO KEY
          YES :  YES KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- Check that the pinch roller is against the capstan or not.



```
      PINCH PLUNGER

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 CONNECTION(DR~SS)
 2 SS BOARD



         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

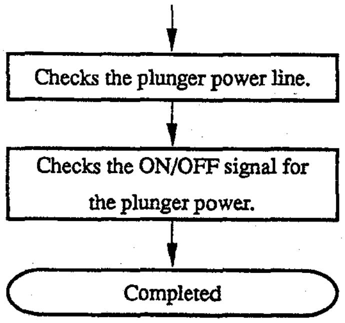
- The probable cause is the faulty connections of connectors or a break in the signal line on the SS board.

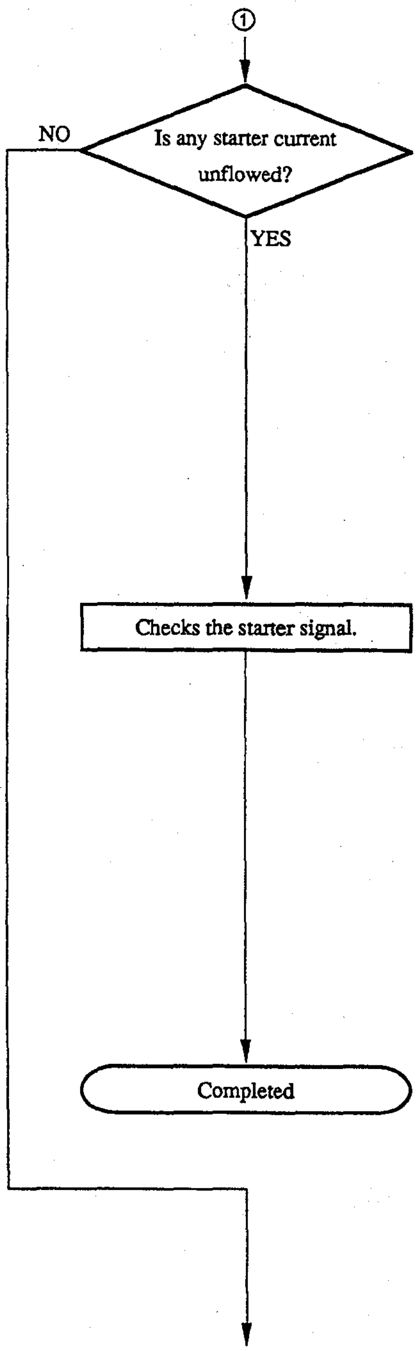


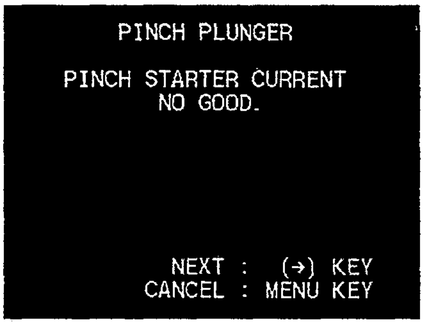
```
      PINCH PLUNGER

  SOME OF FOLLOWING PARTS
      ARE DEFECTIVE.
 1 DR BOARD
 2 SS BOARD
 3 MB BOARD

         NEXT :  (→) KEY
     PREVIOUS :  (←) KEY
       CANCEL : MENU KEY
```

- The probable cause is that the current detecting circuit on the DR board is defective or a SOL. CURRENT signal is shorted on the SS, MB or DR board.

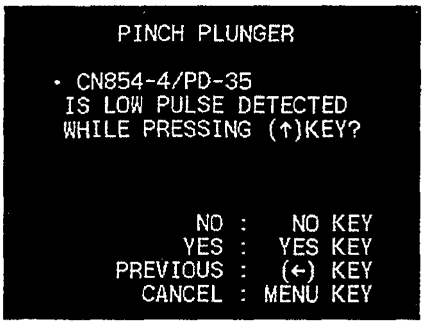
Continues to the next page.


Checks the plunger power line.
Checks the ON/OFF signal for the plunger power.
Completed


①
Is any starter current unflowed?
NO
YES
Checks the starter signal.
Completed

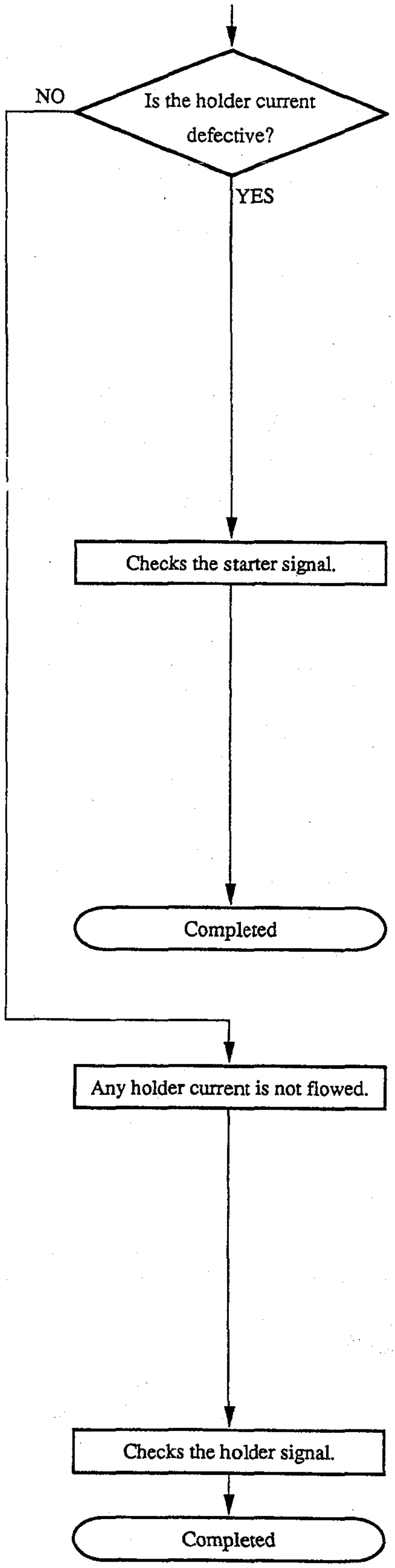


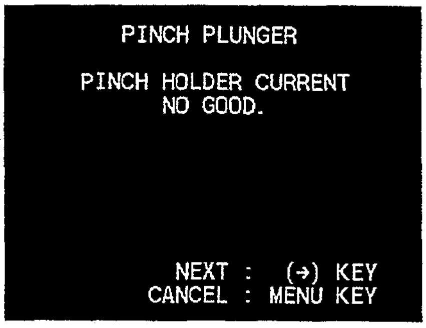
```
          PINCH PLUNGER

    PINCH STARTER CURRENT
            NO GOOD.




             NEXT :   (→) KEY
           CANCEL : MENU KEY
```



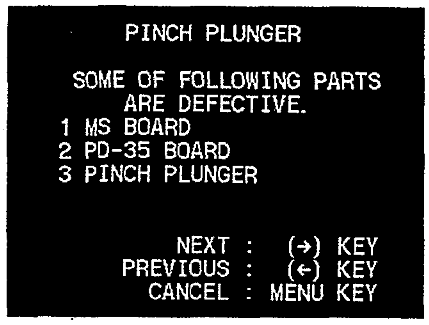
```
          PINCH PLUNGER

   • CN854-4/PD-35
    IS LOW PULSE DETECTED
    WHILE PRESSING (↑)KEY?


                NO :    NO KEY
               YES :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

- Check that about 300 msec pulse occurs every a second while pressing the (↑) key.
- Check that the voltage is more than 10 V while not pressing the (↑) key.


NO
Is the holder current defective?
YES
Checks the starter signal.
Completed
Any holder current is not flowed.
Checks the holder signal.
Completed

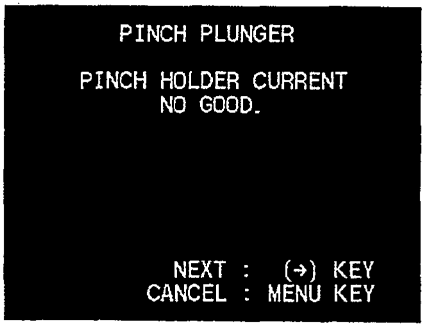


```
        PINCH PLUNGER

    PINCH HOLDER CURRENT
          NO GOOD.




           NEXT :  (→) KEY
         CANCEL : MENU KEY
```



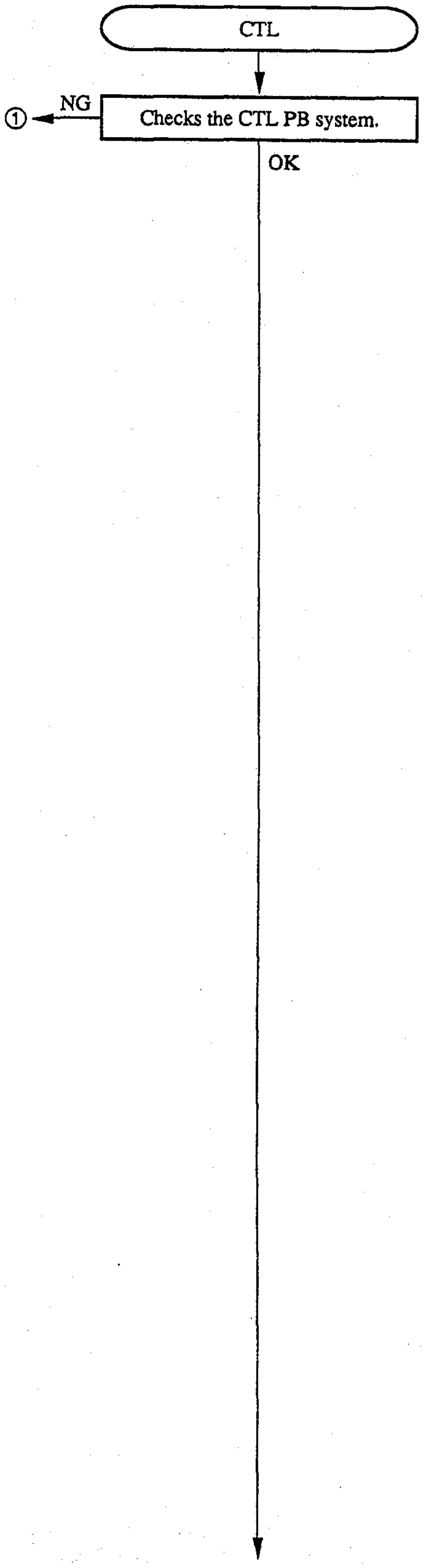
```
        PINCH PLUNGER

   SOME OF FOLLOWING PARTS
       ARE DEFECTIVE.
 1 MS BOARD
 2 PD-35 BOARD
 3 PINCH PLUNGER

           NEXT :  (→) KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

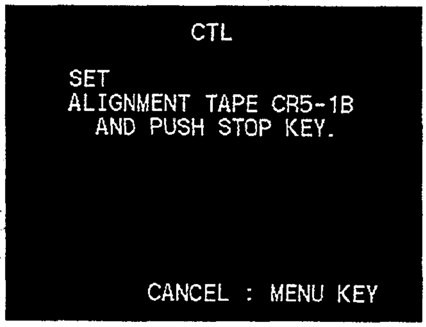
- The starter continues operating.



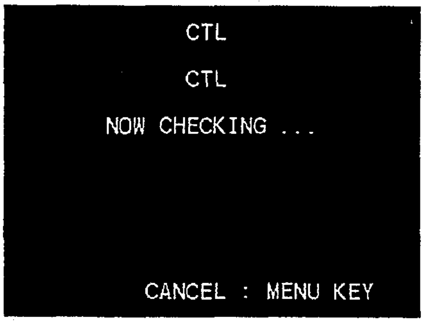
```
        PINCH PLUNGER

    PINCH HOLDER CURRENT
          NO GOOD.




           NEXT :  (→) KEY
         CANCEL : MENU KEY
```

(15) CTL Diagnosis


CTL
NG
①
Checks the CTL PB system.
OK

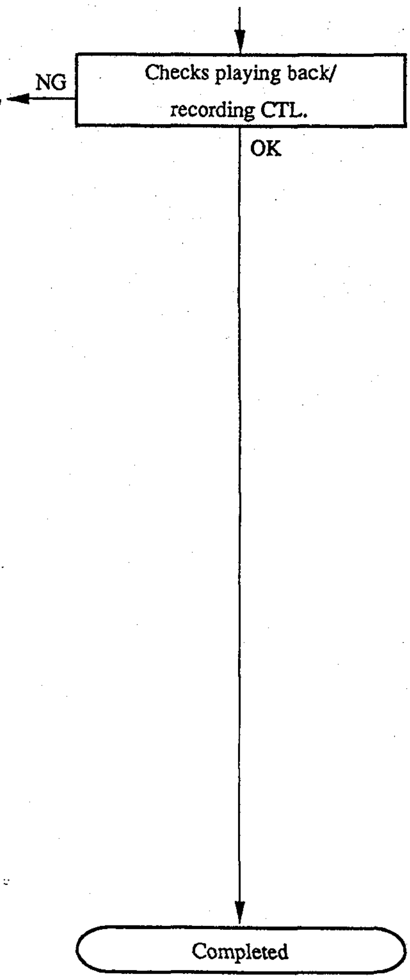


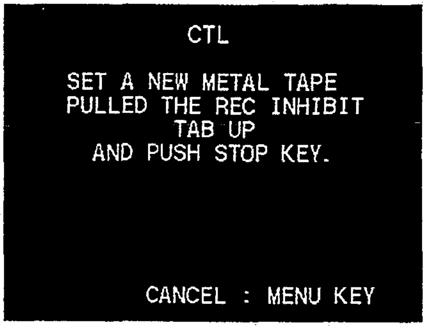
```
CTL

SET
ALIGNMENT TAPE CR5-1B
  AND PUSH STOP KEY.



        CANCEL : MENU KEY
```



```
CTL

CTL

NOW CHECKING ...



        CANCEL : MENU KEY
```

- Using a reference tape, the unit checks the CTL PB system automatically.

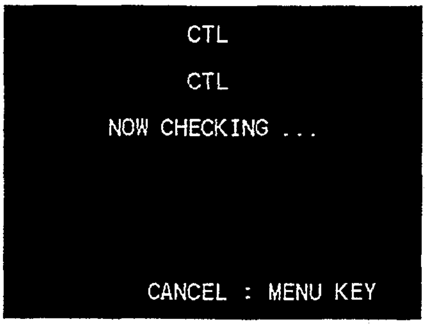

NG
Checks playing back/ recording CTL.
OK
Completed



CTL

SET A NEW METAL TAPE
PULLED THE REC INHIBIT
TAB UP
AND PUSH STOP KEY.

CANCEL : MENU KEY



CTL

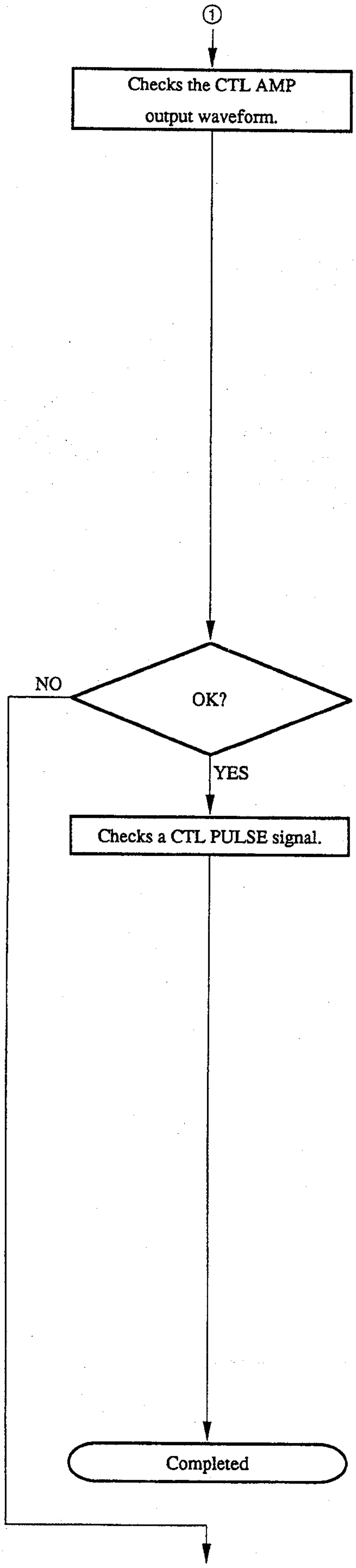
CTL

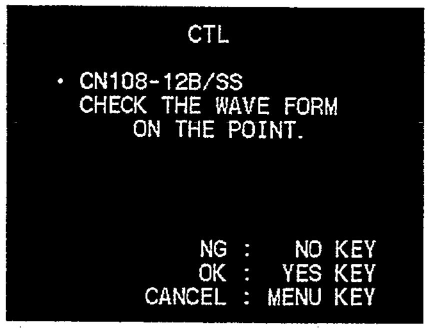
NOW CHECKING ...

CANCEL : MENU KEY

- Using a blank tape (no signal is recorded.), record a CTL signal. Then, play back the recorded portion.

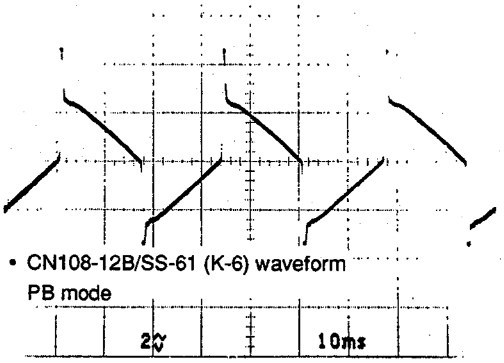
Note : If using the tape with recorded signals, the unit cannot decide whether the tape is recorded this time or not. Therefore, be sure to use a blank tape.

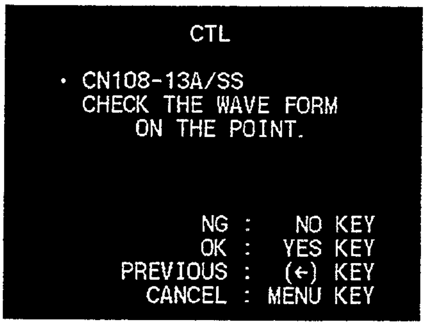

①
Checks the CTL AMP output waveform.
NO
OK?
YES
Checks a CTL PULSE signal.
Completed


CTL

- CN108-12B/SS
  CHECK THE WAVE FORM
  ON THE POINT.

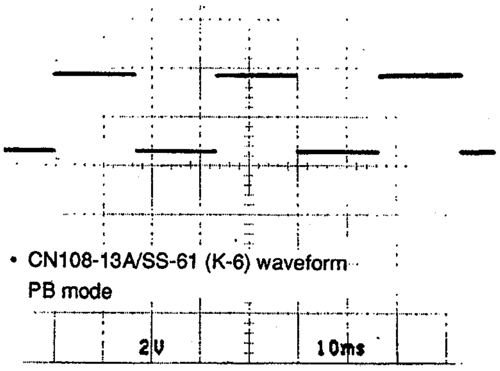
NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY


- CN108-12B/SS-61 (K-6) waveform
  PB mode

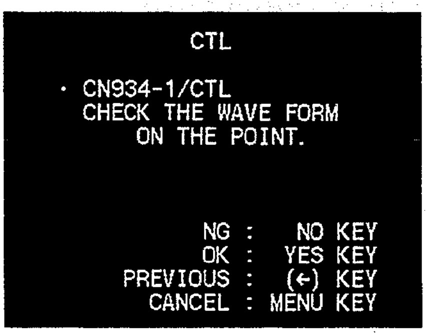

CTL

- CN108-13A/SS
  CHECK THE WAVE FORM
  ON THE POINT.

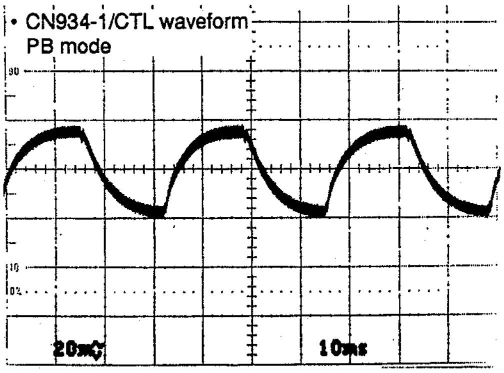
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

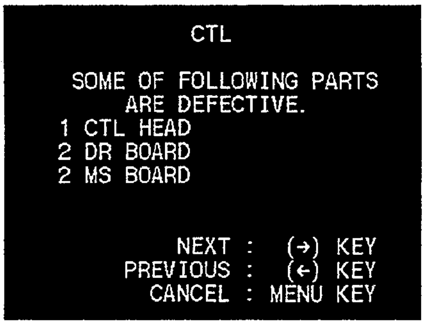

- CN108-13A/SS-61 (K-6) waveform
  PB mode

Checks the waveform of the CTL HEAD output signal.



```
CTL

• CN934-1/CTL
  CHECK THE WAVE FORM
      ON THE POINT.


              NG :   NO KEY
              OK :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

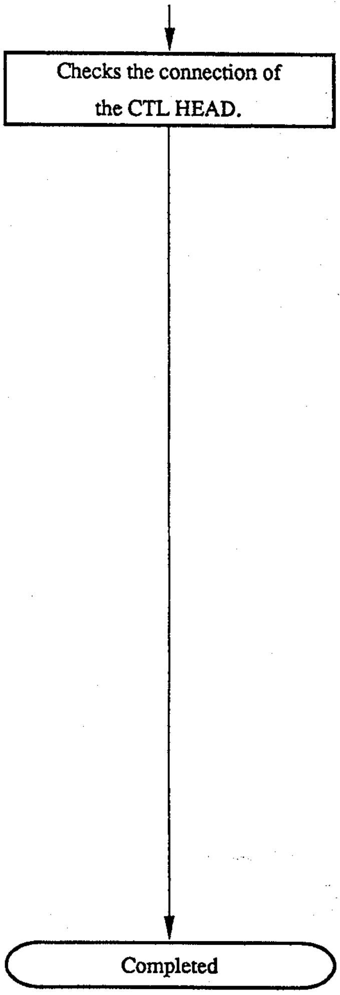


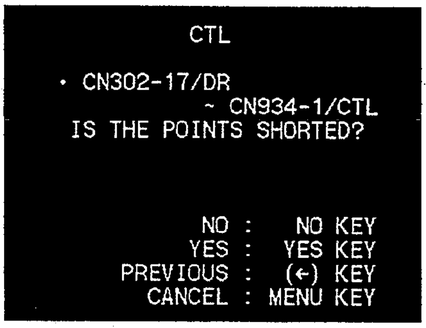


```
CTL

 SOME OF FOLLOWING PARTS
     ARE DEFECTIVE.
1 CTL HEAD
2 DR BOARD
2 MS BOARD


            NEXT :  (→) KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```

- Perform the CTL head adjustment and check with referring to sections 7-6 and 7-7 in Service Manual Vol. 1.

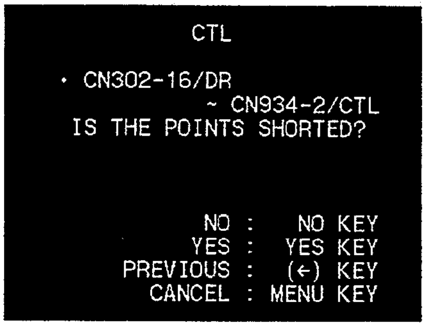
Continues to the next page.


Checks the connection of the CTL HEAD.
Completed



```
            CTL

  • CN302-17/DR
              ~ CN934-1/CTL
  IS THE POINTS SHORTED?


             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

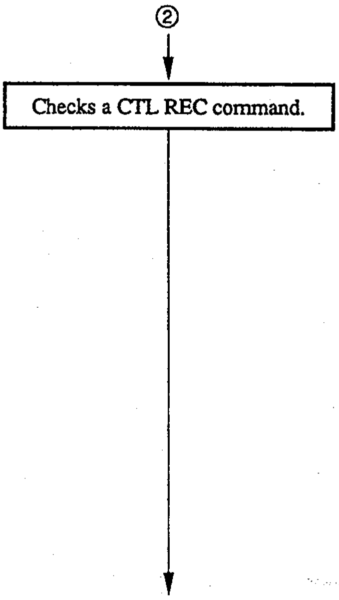
- CN302/DR-214 (H-5)

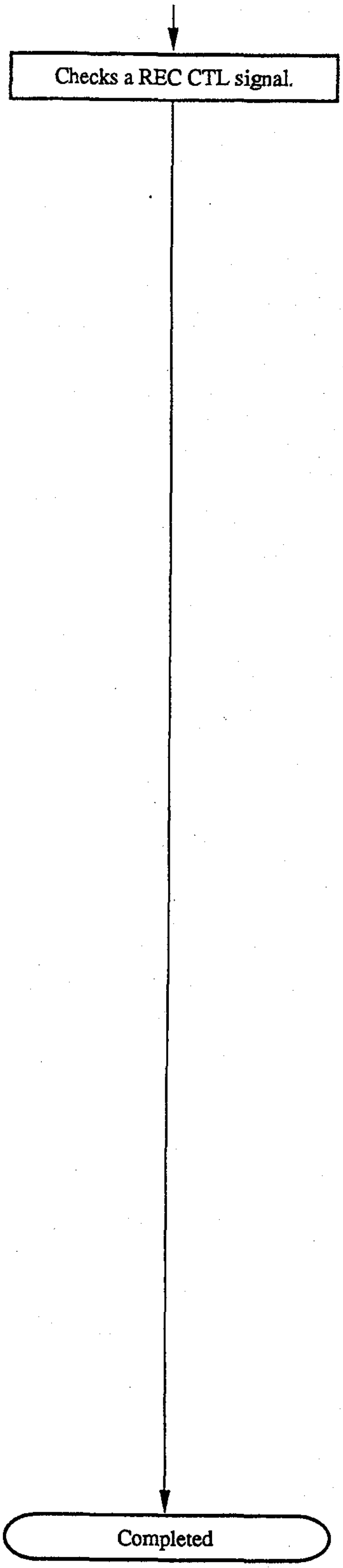


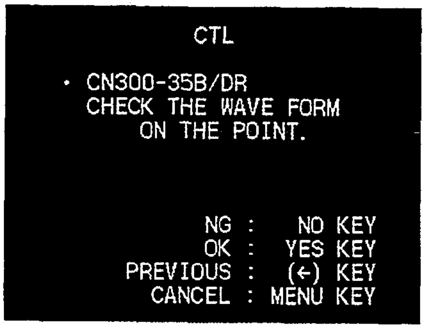
```
            CTL

  • CN302-16/DR
              ~ CN934-2/CTL
  IS THE POINTS SHORTED?


             NO :   NO KEY
            YES :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

- CN302/DR-214 (H-5)

- Stop the diagnosis and turn off the power. Then, check the connections by using a tester and so on.
  After checking, turn on the power and continue the diagnosis.


②
Checks a CTL REC command.

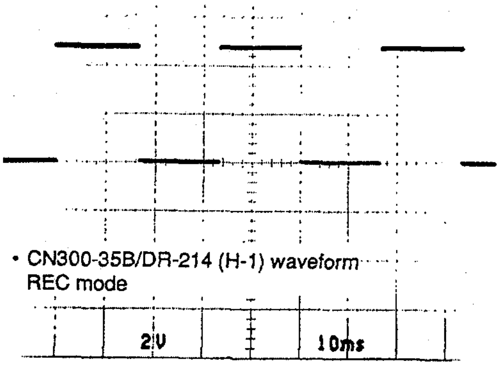

Checks a REC CTL signal.
Completed



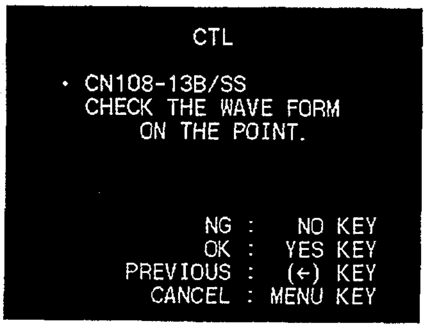
CTL

- CN300-35B/DR
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



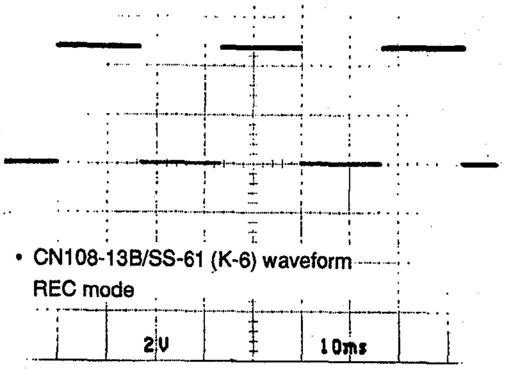
- CN300-35B/DR-214 (H-1) waveform
  REC mode



CTL

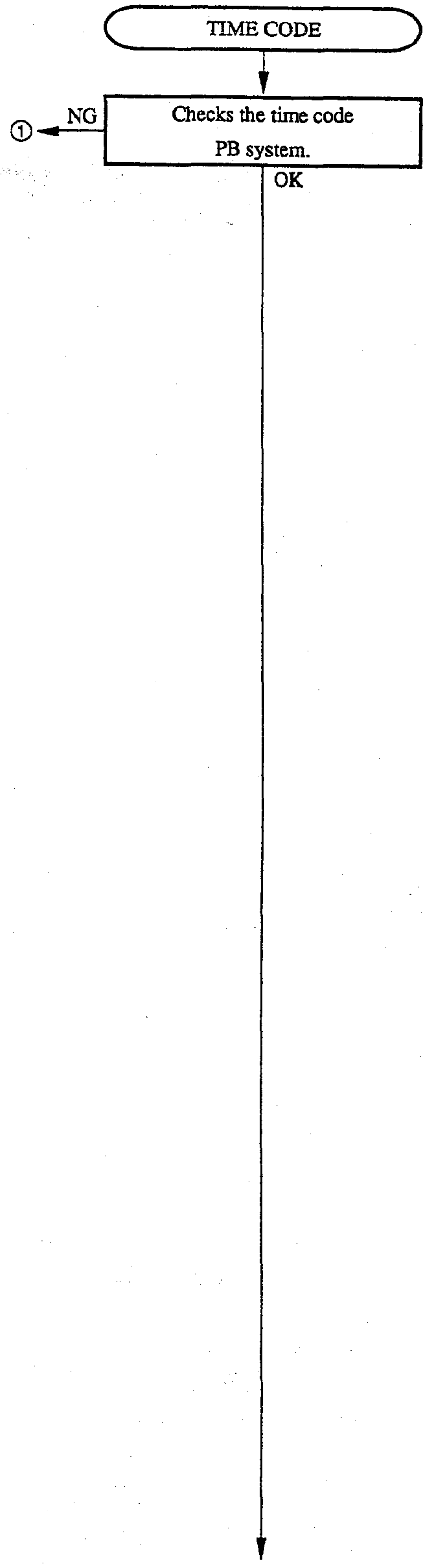
- CN108-13B/SS
  CHECK THE WAVE FORM
  ON THE POINT.

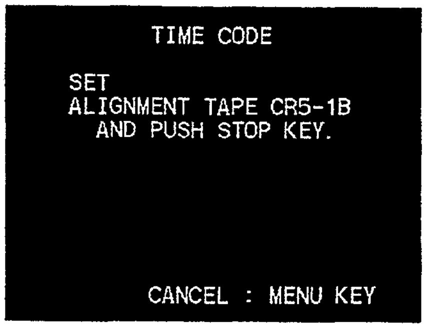
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



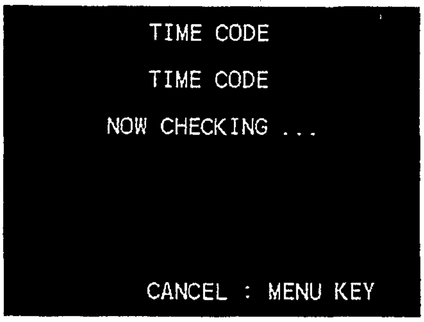
- CN108-13B/SS-61 (K-6) waveform
  REC mode

(16) TIME CODE Diagnosis


TIME CODE
NG
①
Checks the time code PB system.
OK

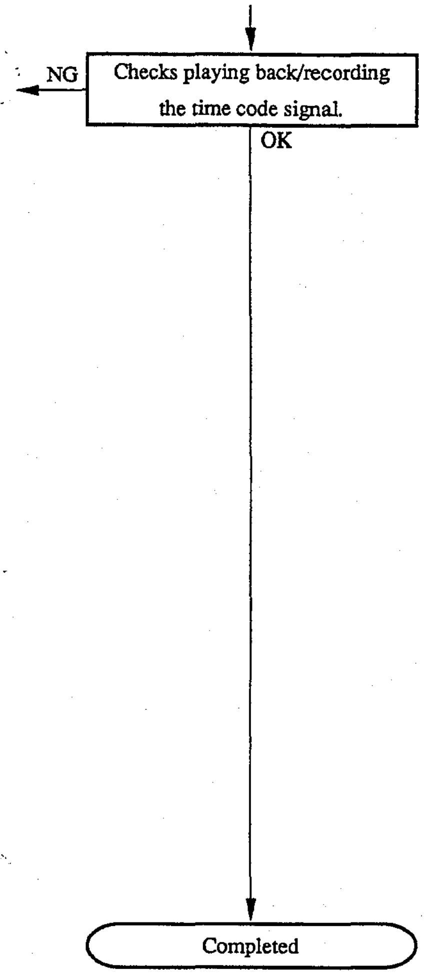


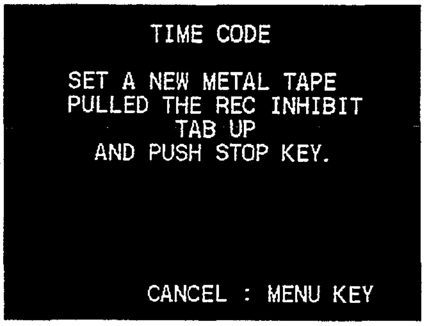
```
        TIME CODE

   SET
   ALIGNMENT TAPE CR5-1B
     AND PUSH STOP KEY.





           CANCEL : MENU KEY
```



```
        TIME CODE

        TIME CODE

     NOW CHECKING ...




           CANCEL : MENU KEY
```

- Using a reference tape, the unit checks the time code PB system automatically.

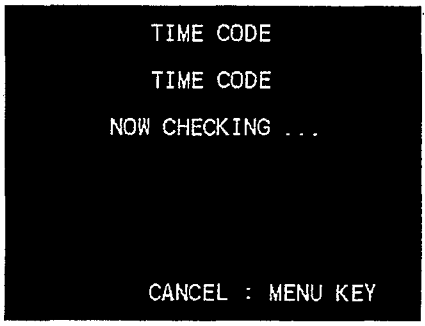

NG
Checks playing back/recording the time code signal.
OK
Completed



TIME CODE

SET A NEW METAL TAPE
PULLED THE REC INHIBIT
TAB UP
AND PUSH STOP KEY.

CANCEL : MENU KEY



TIME CODE

TIME CODE

NOW CHECKING . . .

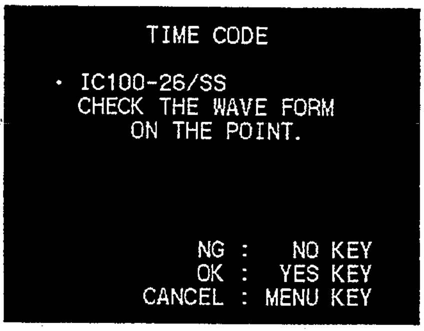
CANCEL : MENU KEY

- Using a blank tape (no signal is recorded.), the unit automatically records a time code signal. Then, play back the recorded portion.

Note : If using the tape with recorded signals, the unit cannot decide whether the tape is recorded at this time or not. Therefore, be sure to use a blank tape.

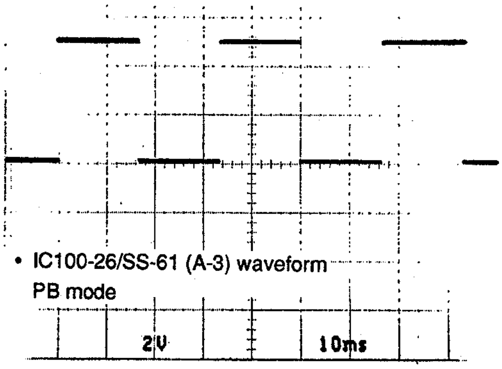
①

Checks a CTL PULSE signal.


TIME CODE

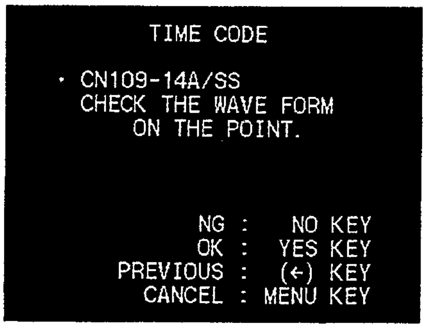
- IC100-26/SS
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
CANCEL : MENU KEY



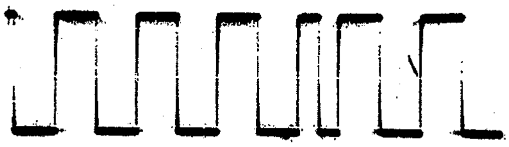
- IC100-26/SS-61 (A-3) waveform
  PB mode

Checks a PB LTC signal.


TIME CODE

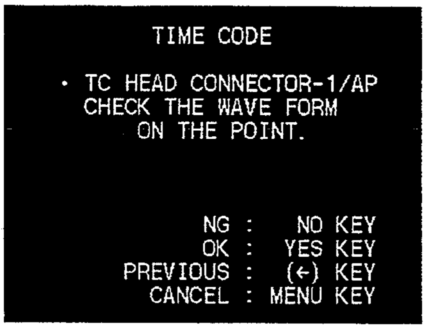
- CN109-14A/SS
  CHECK THE WAVE FORM
  ON THE POINT.

NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY

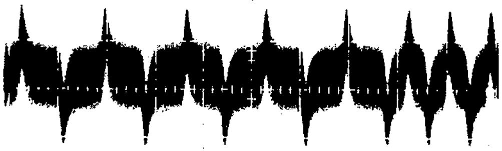


- CN109-14A/SS-61 (C-6) waveform
  PB mode
  2 V 500 μs

Checks a TC HEAD input signal.

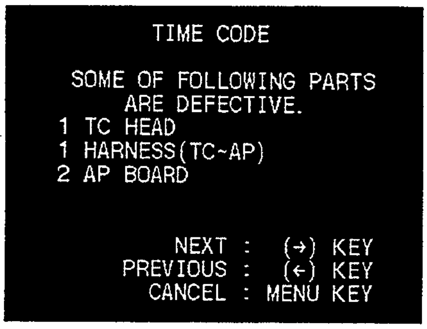


```
           TIME CODE

  • TC HEAD CONNECTOR-1/AP
    CHECK THE WAVE FORM
        ON THE POINT.



                NG :    NO KEY
                OK :   YES KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```



- CN3-1/AP-31 (G-4) waveform
  PB mode

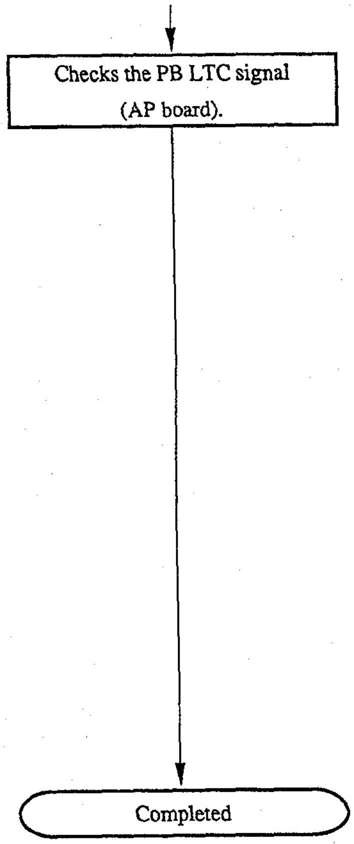
10 mV 500 μs

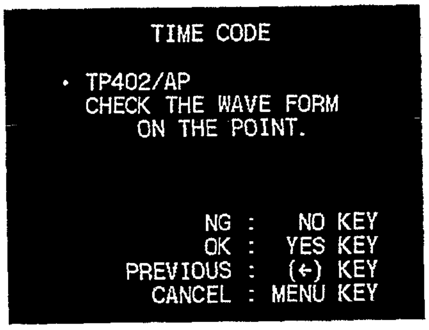


```
           TIME CODE

     SOME OF FOLLOWING PARTS
         ARE DEFECTIVE.
  1 TC HEAD
  1 HARNESS(TC~AP)
  2 AP BOARD


              NEXT :   (→) KEY
          PREVIOUS :   (←) KEY
            CANCEL : MENU KEY
```

- Refer to sections 7-8 through 7-11 in Service Manual Vol. 1.

Continues to the next page.

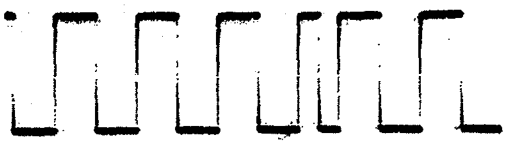

Checks the PB LTC signal (AP board).
Completed



TIME CODE

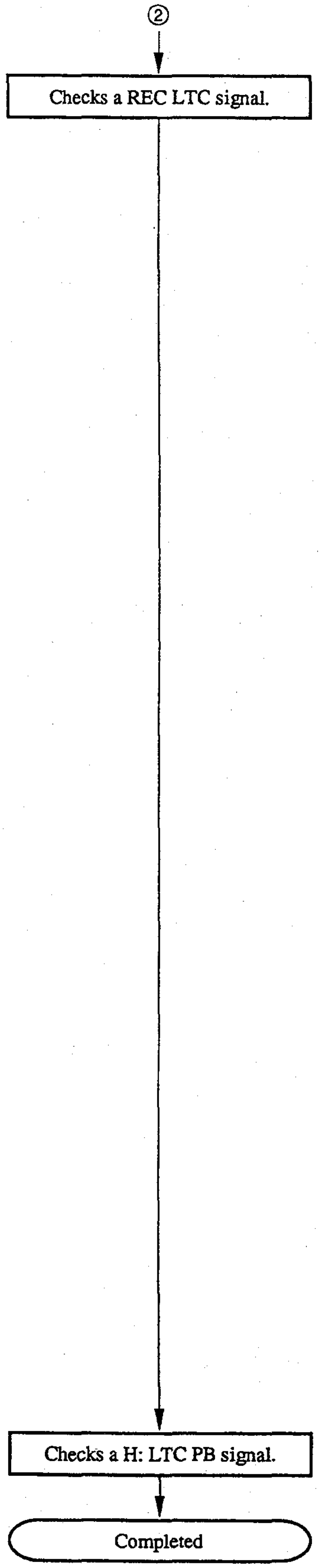
- TP402/AP
  CHECK THE WAVE FORM
  ON THE POINT.

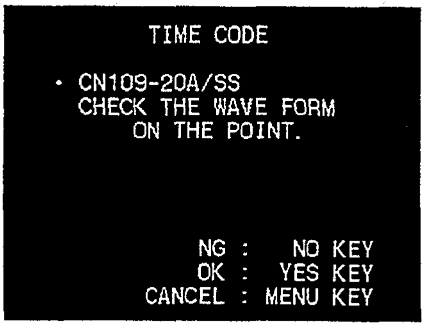
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



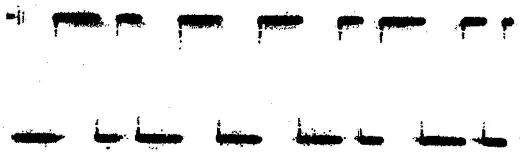
- TP402/AP-31 (G-5) waveform
  PB mode

2 V 500 μs


②
Checks a REC LTC signal.
Checks a H: LTC PB signal.
Completed

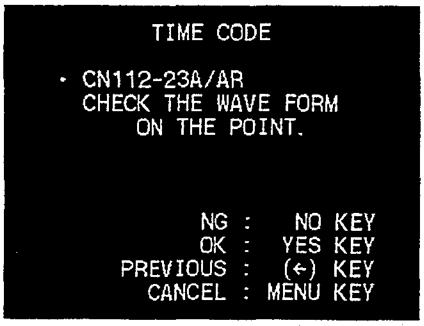


```
        TIME CODE

  • CN109-20A/SS
    CHECK THE WAVE FORM
       ON THE POINT.



             NG :   NO KEY
             OK :  YES KEY
         CANCEL : MENU KEY
```

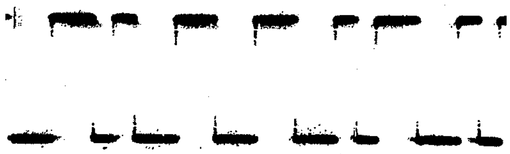


- CN109-20A/SS-61 (C-6) waveform
  REC mode

2 V 500 μs



```
        TIME CODE

  • CN112-23A/AR
    CHECK THE WAVE FORM
       ON THE POINT.



             NG :   NO KEY
             OK :  YES KEY
       PREVIOUS :  (←) KEY
         CANCEL : MENU KEY
```

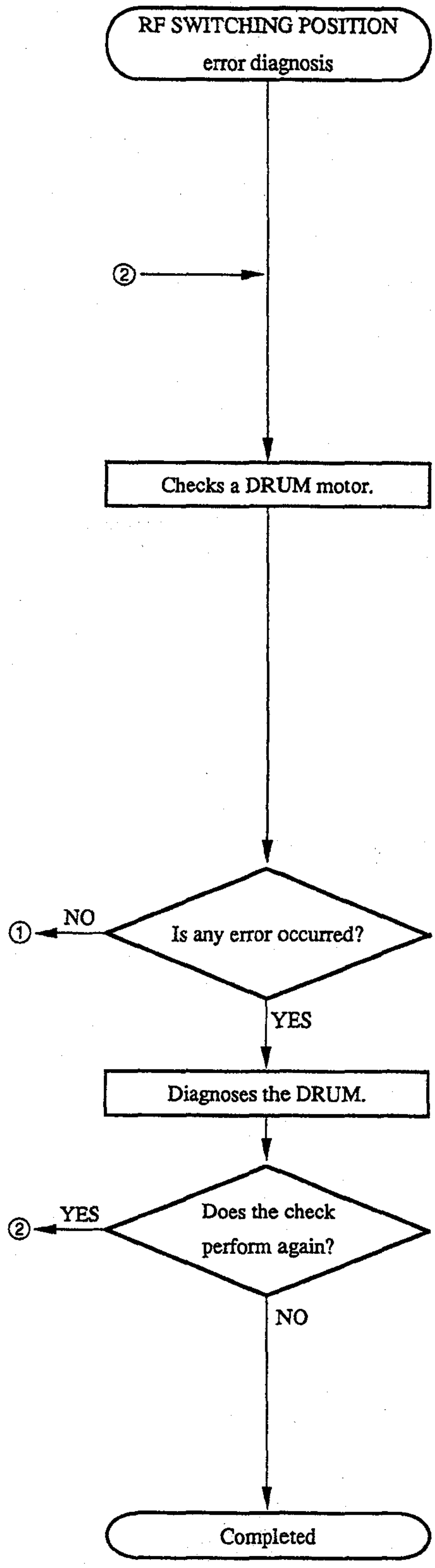


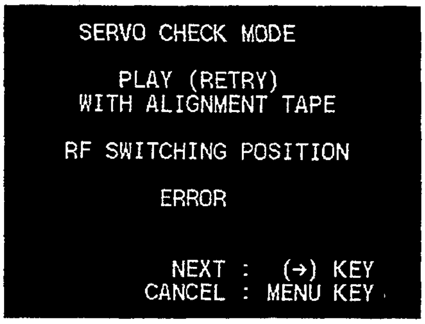
- CN112-23A/AR-14 (E-5) waveform
  REC mode

2 V 500 μs

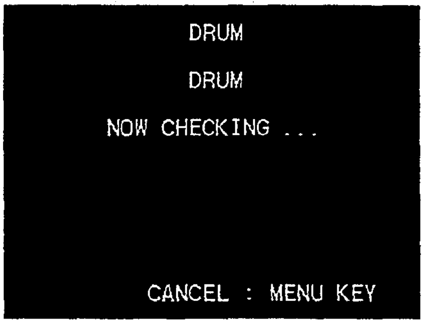
(17) SW POS NG

- SW POSITION is checked at WITH ALIGNMENT TAPE of AUTO CHECK in SERVO CHECK menu. When any error occurs at the SW POSITION menu, perform diagnosis as follows;


RF SWITCHING POSITION error diagnosis
②
Checks a DRUM motor.
①
NO
Is any error occurred?
YES
Diagnoses the DRUM.
②
YES
Does the check perform again?
NO
Completed



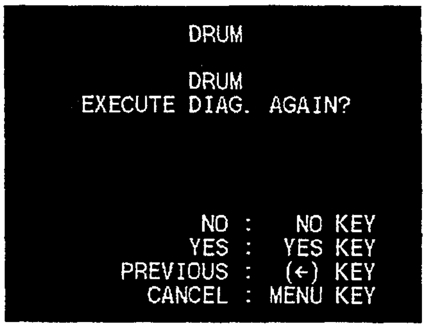
```
SERVO CHECK MODE

   PLAY (RETRY)
WITH ALIGNMENT TAPE

RF SWITCHING POSITION

        ERROR


          NEXT :  (→) KEY
        CANCEL :  MENU KEY
```



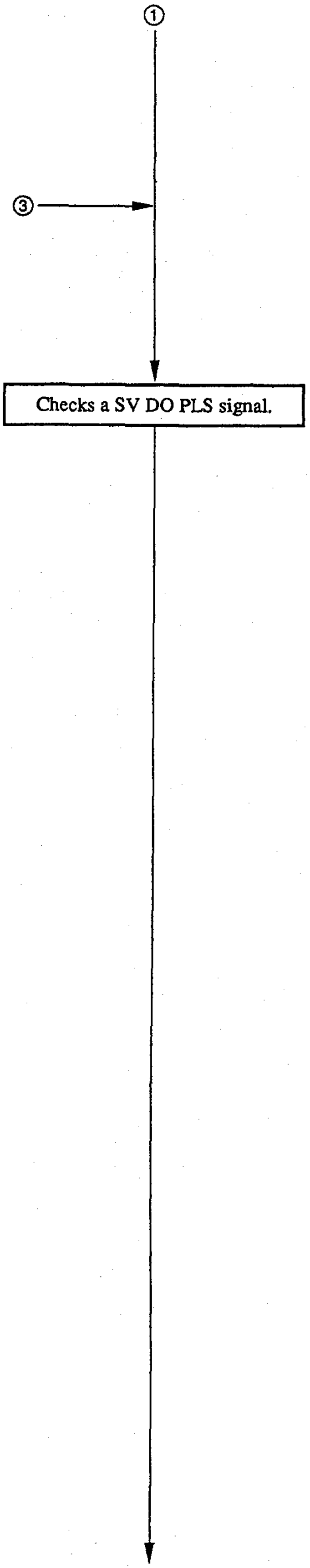
```
         DRUM

         DRUM

    NOW CHECKING ...





        CANCEL : MENU KEY
```

- For details, refer to the flowchart as shown in (12) DRUM Diagnosis.

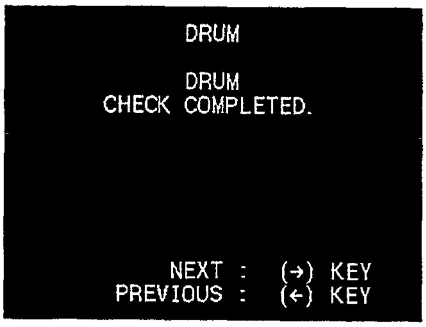
- For details, refer to the flowchart as shown in (12) DRUM Diagnosis.



```
          DRUM

          DRUM
 EXECUTE DIAG. AGAIN?



              NO :   NO KEY
             YES :  YES KEY
        PREVIOUS :  (←) KEY
          CANCEL : MENU KEY
```



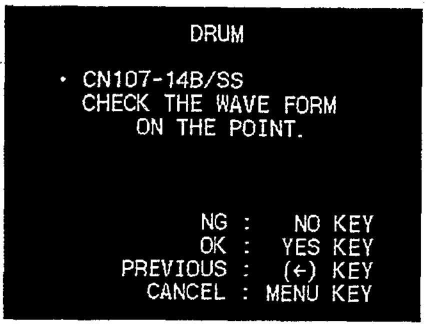
Checks a SV DO PLS signal.



DRUM

DRUM
CHECK COMPLETED.

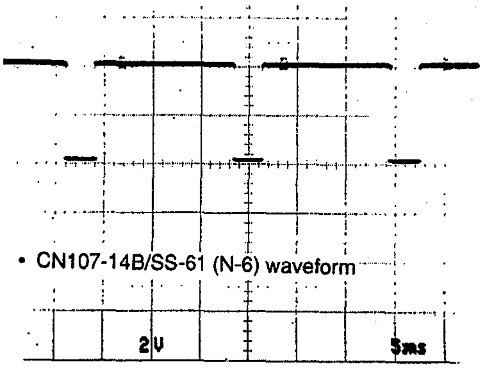
NEXT : (→) KEY
PREVIOUS : (←) KEY



DRUM

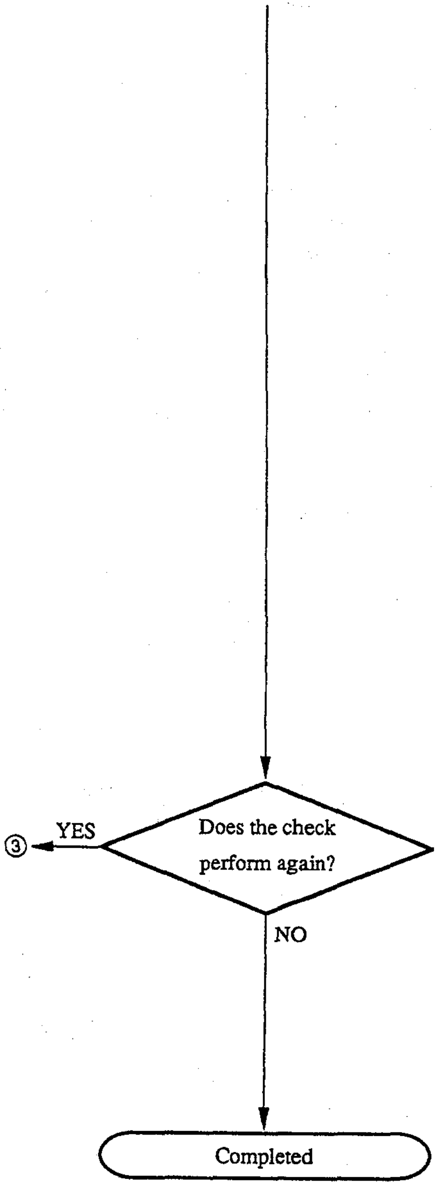
• CN107-14B/SS
CHECK THE WAVE FORM
ON THE POINT.

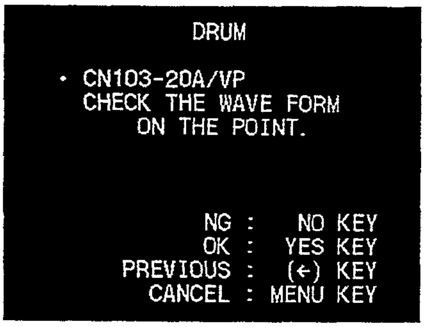
NG : NO KEY
OK : YES KEY
PREVIOUS : (←) KEY
CANCEL : MENU KEY



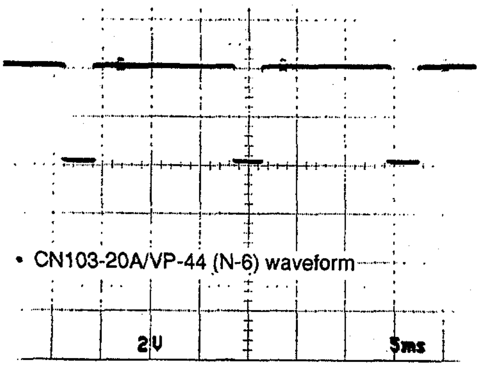
• CN107-14B/SS-61 (N-6) waveform

Continues to the next page.

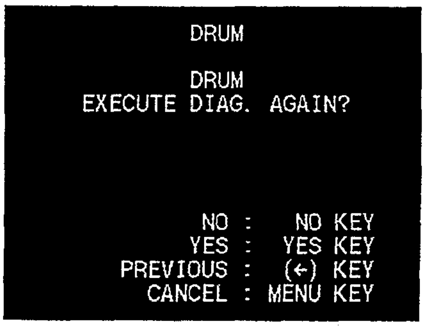

③
YES
Does the check perform again?
NO
Completed



```
                DRUM

  • CN103-20A/VP
    CHECK THE WAVE FORM
       ON THE POINT.



              NG :    NO KEY
              OK :   YES KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```



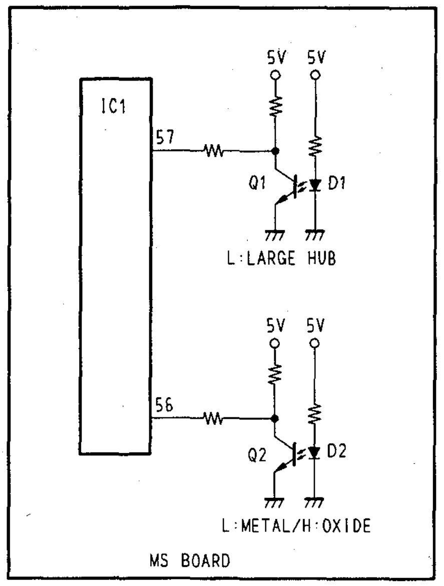
• CN103-20A/VP-44 (N-6) waveform



```
                DRUM

                DRUM
        EXECUTE DIAG. AGAIN?



              NO :    NO KEY
             YES :   YES KEY
        PREVIOUS :   (←) KEY
          CANCEL : MENU KEY
```

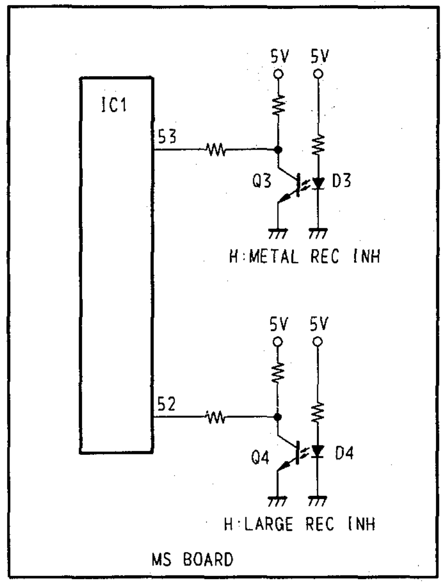
BLOCK DIAGRAM

• CASSETTE ID



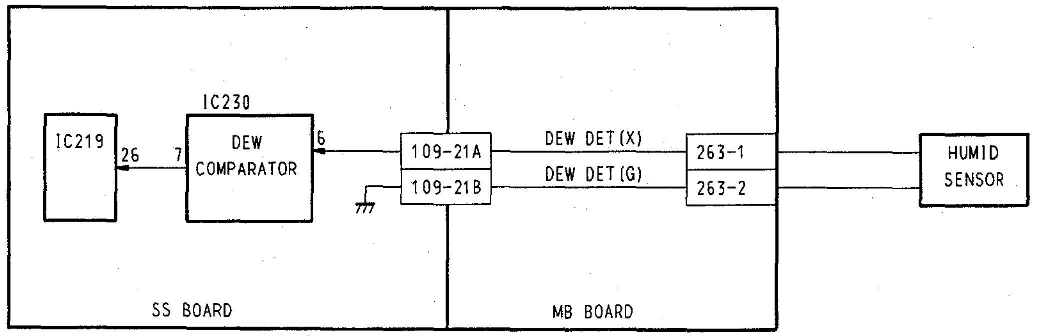
5V 5V
IC1
57
Q1
D1
L:LARGE HUB
5V 5V
56
Q2
D2
L:METAL/H:OXIDE
MS BOARD

• REC INHIBIT



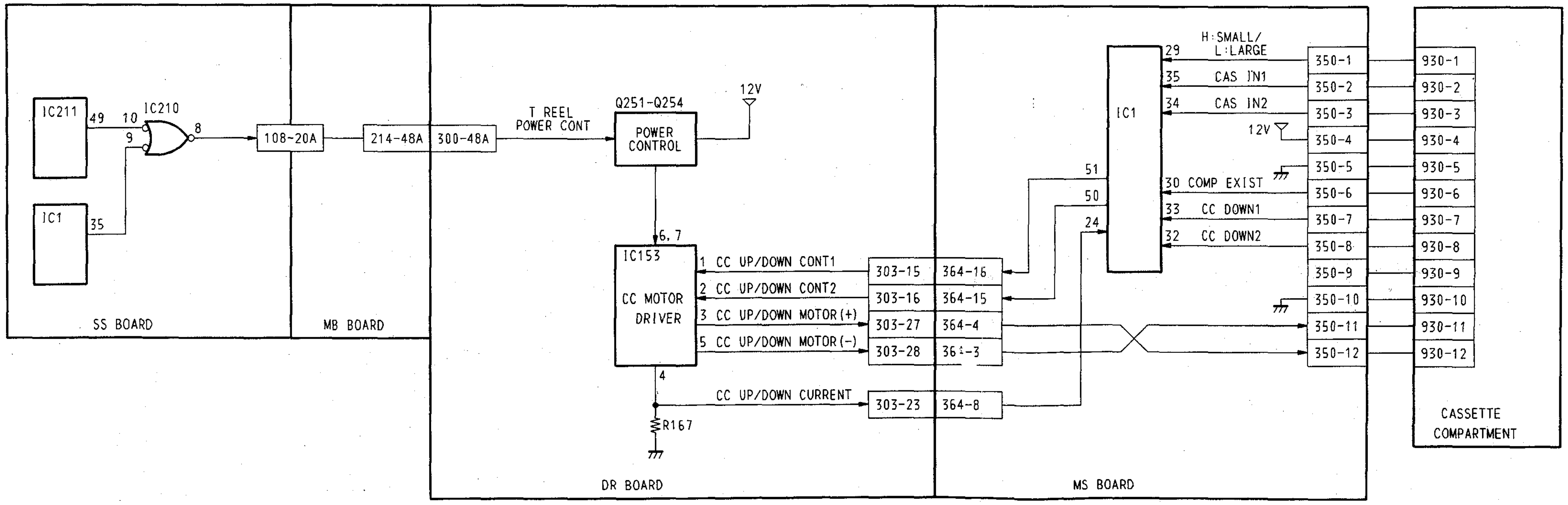
5V 5V
IC1
53
Q3
D3
H:METAL REC INH
5V 5V
52
Q4
D4
H:LARGE REC INH
MS BOARD

• HUMID SENSOR



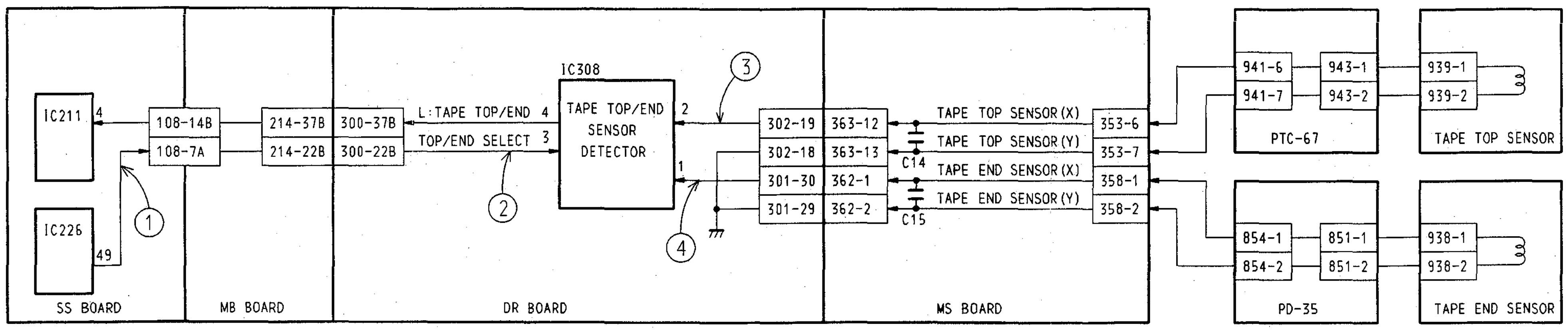
IC230
IC219
26
7
DEW COMPARATOR
6
109-21A
109-21B
DEW DET(X)
DEW DET(G)
263-1
263-2
HUMID SENSOR
SS BOARD
MB BOARD

• CASSETTE COMPARTMENT

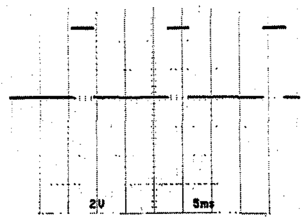


IC211
49
10
IC210
9
8
IC1
35
108-20A
214-48A
300-48A
T REEL POWER CONT
Q251-Q254
POWER CONTROL
12V
6, 7
IC153
CC MOTOR DRIVER
1 CC UP/DOWN CONT1
2 CC UP/DOWN CONT2
3 CC UP/DOWN MOTOR(+)
5 CC UP/DOWN MOTOR(-)
4
CC UP/DOWN CURRENT
R167
303-15
303-16
303-27
303-28
303-23
364-16
364-15
364-4
364-3
364-8
IC1
51
50
24
H:SMALL/ L:LARGE
29
35 CAS IN1
34 CAS IN2
12V
30 COMP EXIST
33 CC DOWN1
32 CC DOWN2
350-1
350-2
350-3
350-4
350-5
350-6
350-7
350-8
350-9
350-10
350-11
350-12
930-1
930-2
930-3
930-4
930-5
930-6
930-7
930-8
930-9
930-10
930-11
930-12
CASSETTE COMPARTMENT
SS BOARD
MB BOARD
DR BOARD
MS BOARD

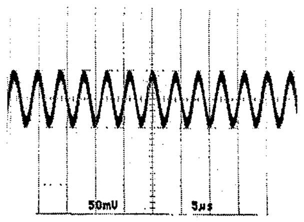
• TAPE TOP/END SENSOR


IC211
4
IC226
49
①
108-14B
108-7A
214-37B
214-22B
300-37B
300-22B
L:TAPE TOP/END 4
TOP/END SELECT 3
②
IC308
TAPE TOP/END
SENSOR
DETECTOR
2
1
③
④
302-19
302-18
301-30
301-29
363-12
363-13
362-1
362-2
C14
C15
TAPE TOP SENSOR(X)
TAPE TOP SENSOR(Y)
TAPE END SENSOR(X)
TAPE END SENSOR(Y)
353-6
353-7
358-1
358-2
941-6
941-7
943-1
943-2
PTC-67
939-1
939-2
TAPE TOP SENSOR
854-1
854-2
851-1
851-2
PD-35
938-1
938-2
TAPE END SENSOR
SS BOARD
MB BOARD
DR BOARD
MS BOARD

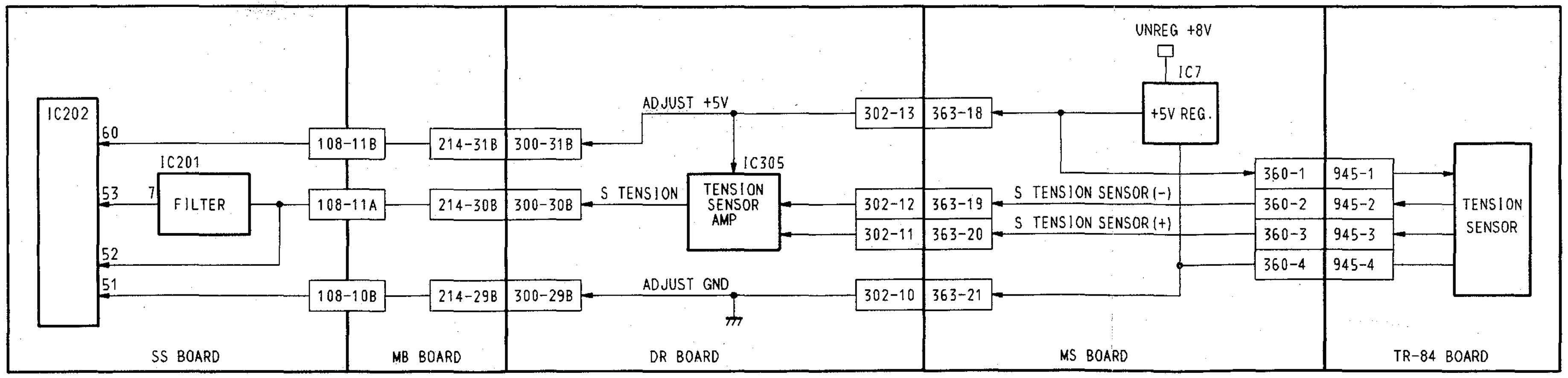
①②



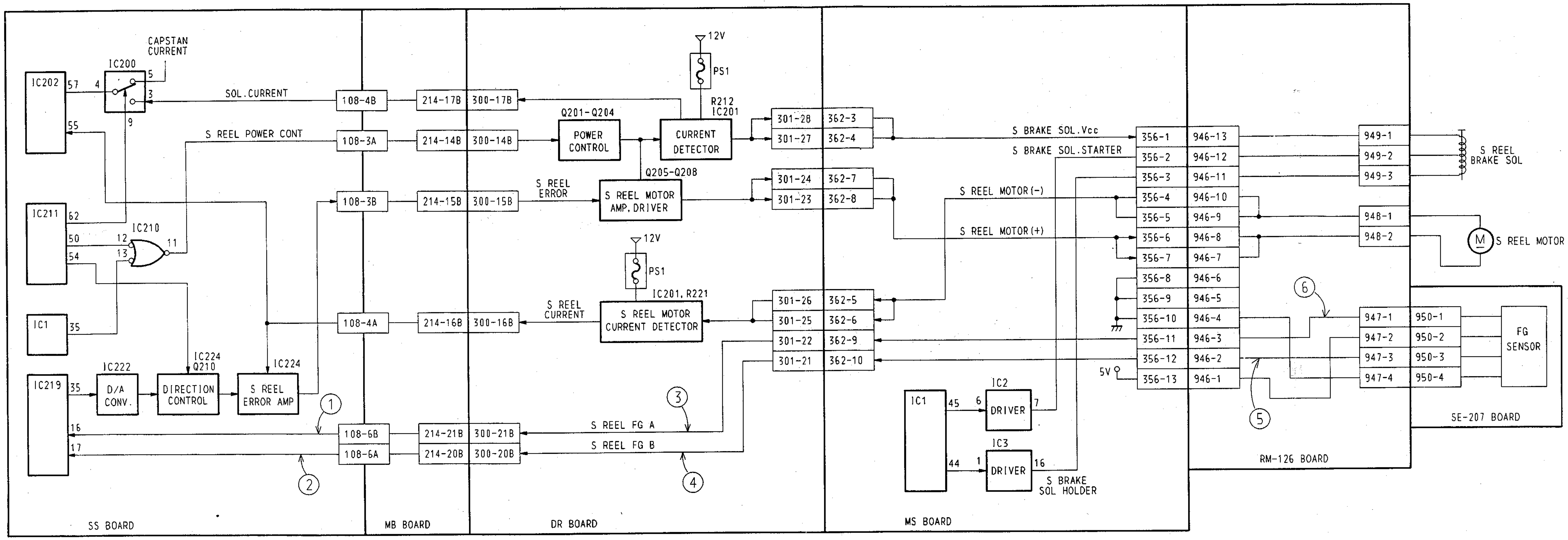
③④



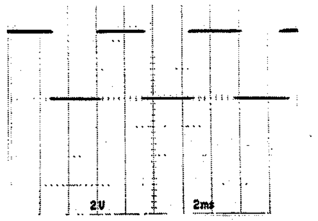
• TENSION SENSOR


IC202
60
53
52
51
IC201
7
FILTER
108-11B
108-11A
108-10B
214-31B
214-30B
214-29B
300-31B
300-30B
300-29B
ADJUST +5V
S TENSION
ADJUST GND
IC305
TENSION
SENSOR
AMP
302-13
302-12
302-11
302-10
363-18
363-19
363-20
363-21
UNREG +8V
IC7
+5V REG.
S TENSION SENSOR(-)
S TENSION SENSOR(+)
360-1
360-2
360-3
360-4
945-1
945-2
945-3
945-4
TENSION
SENSOR
SS BOARD
MB BOARD
DR BOARD
MS BOARD
TR-84 BOARD

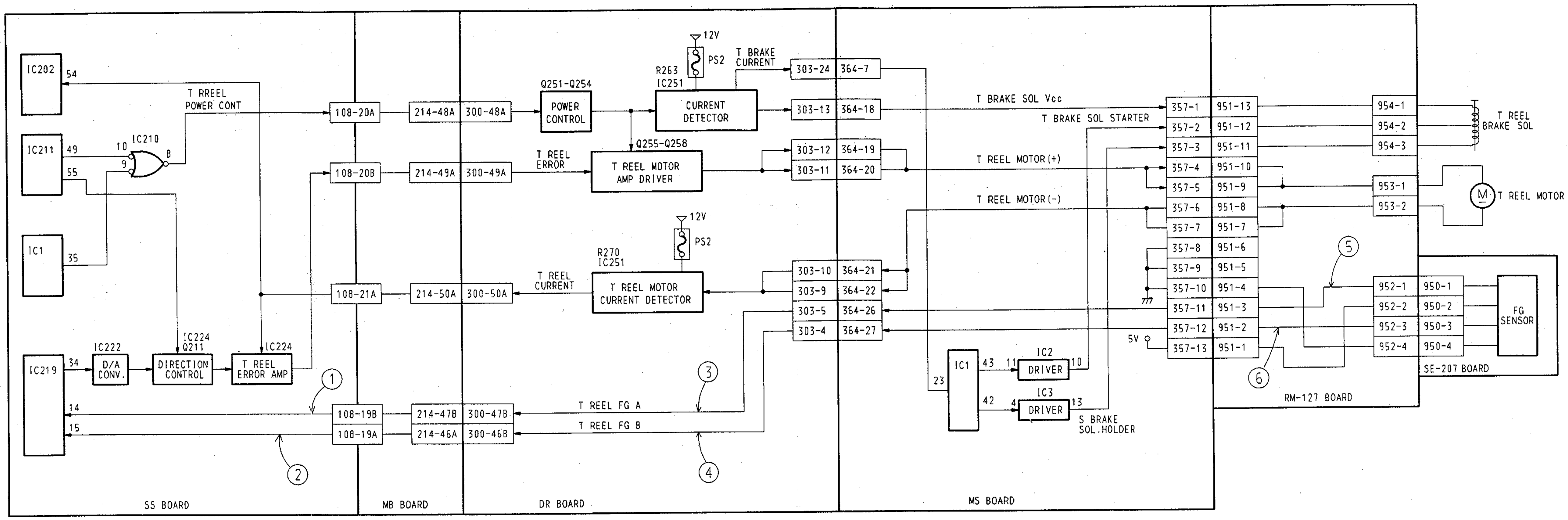
• S REEL


IC202
57
55
IC200
4
5
3
9
CAPSTAN CURRENT
SOL.CURRENT
S REEL POWER CONT
IC211
62
50
54
IC210
12
13
11
IC1
35
IC219
35
16
17
IC222
D/A CONV.
IC224 Q210
DIRECTION CONTROL
IC224
S REEL ERROR AMP
①
②
108-4B
108-3A
108-3B
108-4A
108-6B
108-6A
214-17B
214-14B
214-15B
214-16B
214-21B
214-20B
300-17B
300-14B
300-15B
300-16B
300-21B
300-20B
Q201-Q204
POWER CONTROL
12V
PS1
R212 IC201
CURRENT DETECTOR
Q205-Q208
S REEL ERROR
S REEL MOTOR AMP.DRIVER
12V
PS1
IC201, R221
S REEL CURRENT
S REEL MOTOR CURRENT DETECTOR
S REEL FG A
S REEL FG B
③
④
301-28
301-27
301-24
301-23
301-26
301-25
301-22
301-21
362-3
362-4
362-7
362-8
362-5
362-6
362-9
362-10
S BRAKE SOL.Vcc
S BRAKE SOL.STARTER
S REEL MOTOR(-)
S REEL MOTOR(+)
5V
IC1
45
44
IC2
6
7
DRIVER
IC3
1
16
DRIVER
S BRAKE SOL HOLDER
356-1
356-2
356-3
356-4
356-5
356-6
356-7
356-8
356-9
356-10
356-11
356-12
356-13
946-13
946-12
946-11
946-10
946-9
946-8
946-7
946-6
946-5
946-4
946-3
946-2
946-1
⑤
⑥
949-1
949-2
949-3
S REEL BRAKE SOL
948-1
948-2
M
S REEL MOTOR
947-1
947-2
947-3
947-4
950-1
950-2
950-3
950-4
FG SENSOR
SE-207 BOARD
RM-126 BOARD
SS BOARD
MB BOARD
DR BOARD
MS BOARD

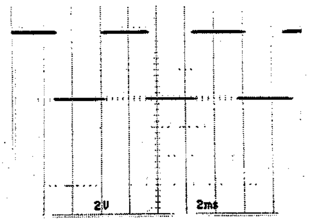
①–⑥


2V
2ms

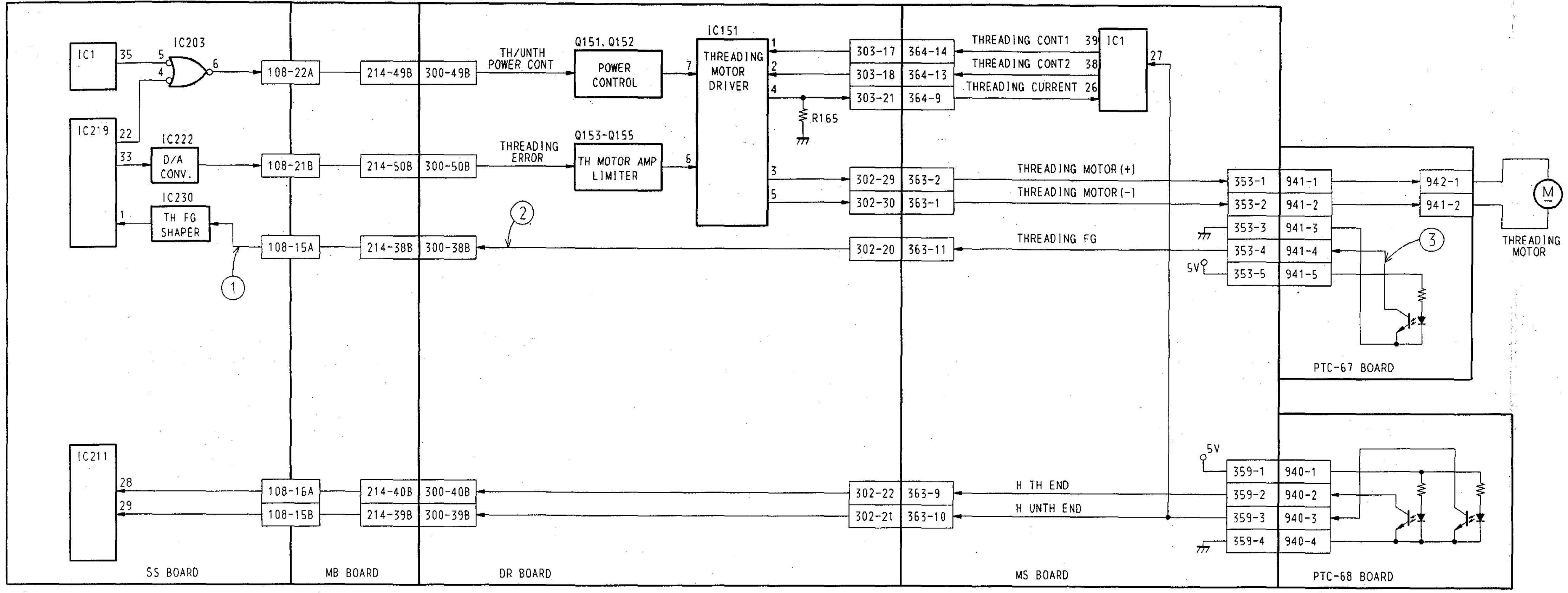
• T REEL


IC202
54
IC211
49
55
IC210
10
9
8
IC1
35
IC219
34
14
15
IC222
D/A CONV.
IC224 Q211
DIRECTION CONTROL
IC224
T REEL ERROR AMP
T RREEL POWER CONT
108-20A
108-20B
108-21A
108-19B
108-19A
214-48A
214-49A
214-50A
214-47B
214-46A
300-48A
300-49A
300-50A
300-47B
300-46B
Q251-Q254
POWER CONTROL
12V
R263 IC251
PS2
T BRAKE CURRENT
CURRENT DETECTOR
Q255-Q258
T REEL ERROR
T REEL MOTOR AMP DRIVER
R270 IC251
T REEL CURRENT
T REEL MOTOR CURRENT DETECTOR
T REEL FG A
T REEL FG B
303-24
303-13
303-12
303-11
303-10
303-9
303-5
303-4
364-7
364-18
364-19
364-20
364-21
364-22
364-26
364-27
T BRAKE SOL Vcc
T BRAKE SOL STARTER
T REEL MOTOR(+)
T REEL MOTOR(-)
IC1
23
43
42
IC2
11
DRIVER
10
IC3
4
DRIVER
13
S BRAKE SOL.HOLDER
5V
357-1
357-2
357-3
357-4
357-5
357-6
357-7
357-8
357-9
357-10
357-11
357-12
357-13
951-13
951-12
951-11
951-10
951-9
951-8
951-7
951-6
951-5
951-4
951-3
951-2
951-1
954-1
954-2
954-3
T REEL BRAKE SOL
953-1
953-2
M
T REEL MOTOR
952-1
952-2
952-3
952-4
950-1
950-2
950-3
950-4
FG SENSOR
SE-207 BOARD
RM-127 BOARD
①
②
③
④
⑤
⑥
SS BOARD
MB BOARD
DR BOARD
MS BOARD

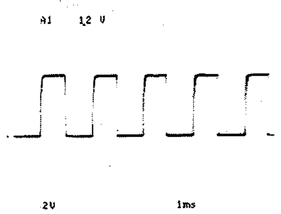
①–⑥


2V
2ms

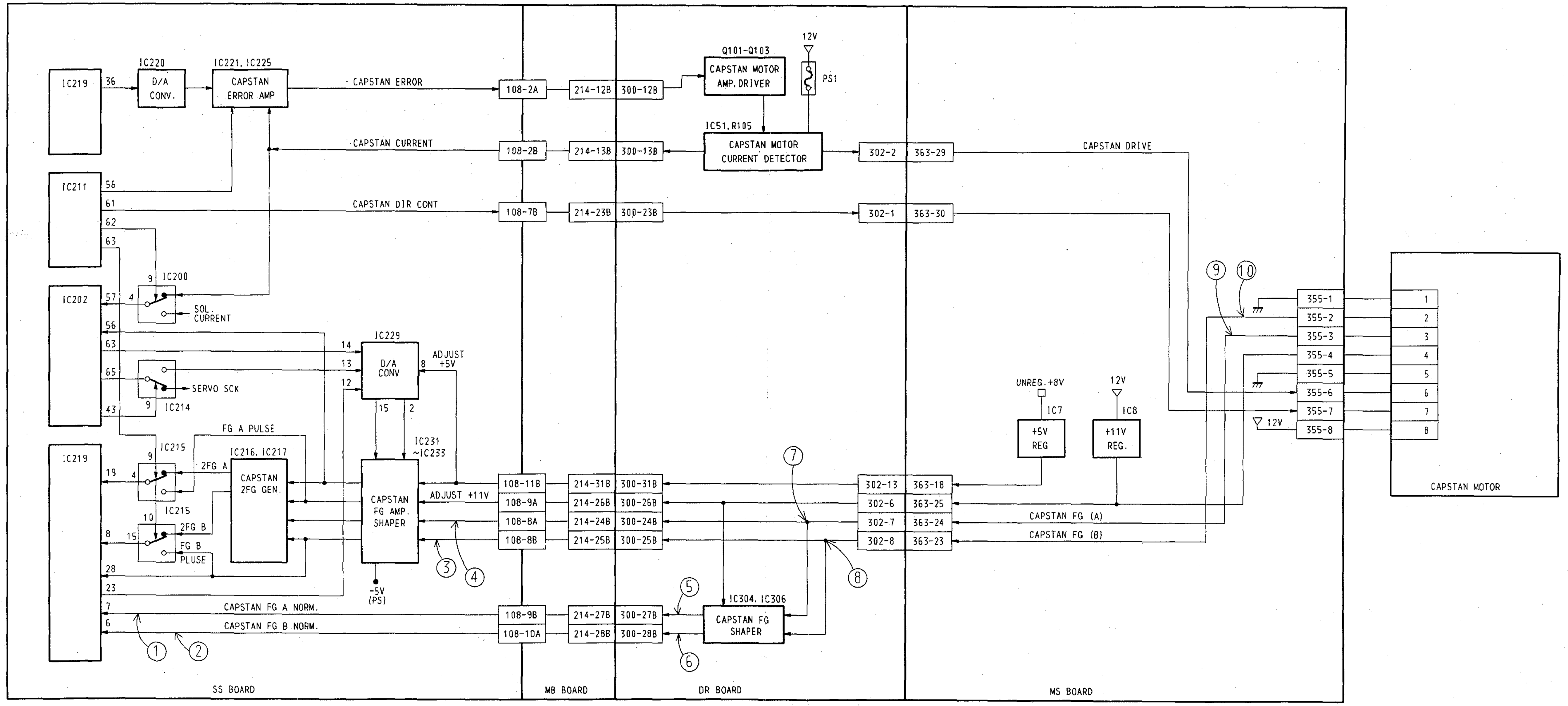
• THREADING


IC1
35
IC203
5
4
6
IC219
22
33
1
IC222
D/A CONV.
IC230
TH FG SHAPER
①
108-22A
108-21B
108-15A
214-49B
300-49B
214-50B
300-50B
214-38B
300-38B
②
TH/UNTH POWER CONT
THREADING ERROR
Q151, Q152
POWER CONTROL
Q153-Q155
TH MOTOR AMP LIMITER
7
6
IC151
THREADING MOTOR DRIVER
1
2
4
3
5
R165
303-17
303-18
303-21
364-14
364-13
364-9
302-29
302-30
302-20
363-2
363-1
363-11
THREADING CONT1 39
THREADING CONT2 38
THREADING CURRENT 26
IC1
27
THREADING MOTOR (+)
THREADING MOTOR (-)
THREADING FG
353-1
353-2
353-3
353-4
353-5
5V
941-1
941-2
941-3
941-4
941-5
③
942-1
941-2
M
THREADING MOTOR
PTC-67 BOARD
IC211
28
29
108-16A
108-15B
214-40B
214-39B
300-40B
300-39B
302-22
302-21
363-9
363-10
H TH END
H UNTH END
5V
359-1
359-2
359-3
359-4
940-1
940-2
940-3
940-4
PTC-68 BOARD
SS BOARD
MB BOARD
DR BOARD
MS BOARD

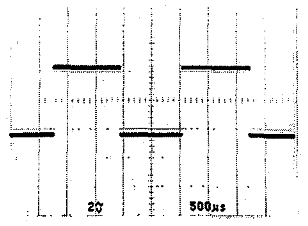
①–③



• **CAPSTAN**


IC219
36
IC220
D/A CONV.
IC221, IC225
CAPSTAN ERROR AMP
CAPSTAN ERROR
108-2A
214-12B
300-12B
Q101-Q103
CAPSTAN MOTOR AMP, DRIVER
12V
PS1
IC51, R105
CAPSTAN MOTOR CURRENT DETECTOR
CAPSTAN CURRENT
108-2B
214-13B
300-13B
302-2
363-29
CAPSTAN DRIVE
IC211
56
61
62
63
CAPSTAN DIR CONT
108-7B
214-23B
300-23B
302-1
363-30
IC202
57
4
9
IC200
SOL. CURRENT
56
63
65
43
9
IC214
SERVO SCK
IC229
14
13
12
D/A CONV
8
ADJUST +5V
15
2
IC231 ~IC233
FG A PULSE
IC219
19
9
IC215
4
2FG A
IC216, IC217
CAPSTAN 2FG GEN.
10
IC215
15
2FG B
FG B PLUSE
8
28
23
CAPSTAN FG AMP. SHAPER
ADJUST +11V
-5V (PS)
108-11B
108-9A
108-8A
108-8B
214-31B
214-26B
214-24B
214-25B
300-31B
300-26B
300-24B
300-25B
302-13
302-6
302-7
302-8
363-18
363-25
363-24
363-23
CAPSTAN FG (A)
CAPSTAN FG (B)
③
④
⑤
⑥
⑦
⑧
IC304, IC306
CAPSTAN FG SHAPER
7
6
CAPSTAN FG A NORM.
CAPSTAN FG B NORM.
108-9B
108-10A
214-27B
214-28B
300-27B
300-28B
①
②
UNREG.+8V
IC7
+5V REG
12V
IC8
+11V REG.
⑨
⑩
12V
355-1
355-2
355-3
355-4
355-5
355-6
355-7
355-8
1
2
3
4
5
6
7
8
CAPSTAN MOTOR
SS BOARD
MB BOARD
DR BOARD
MS BOARD

①②⑤⑥



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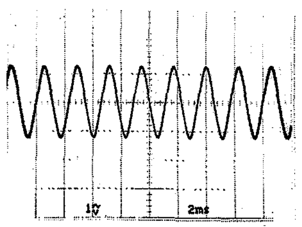
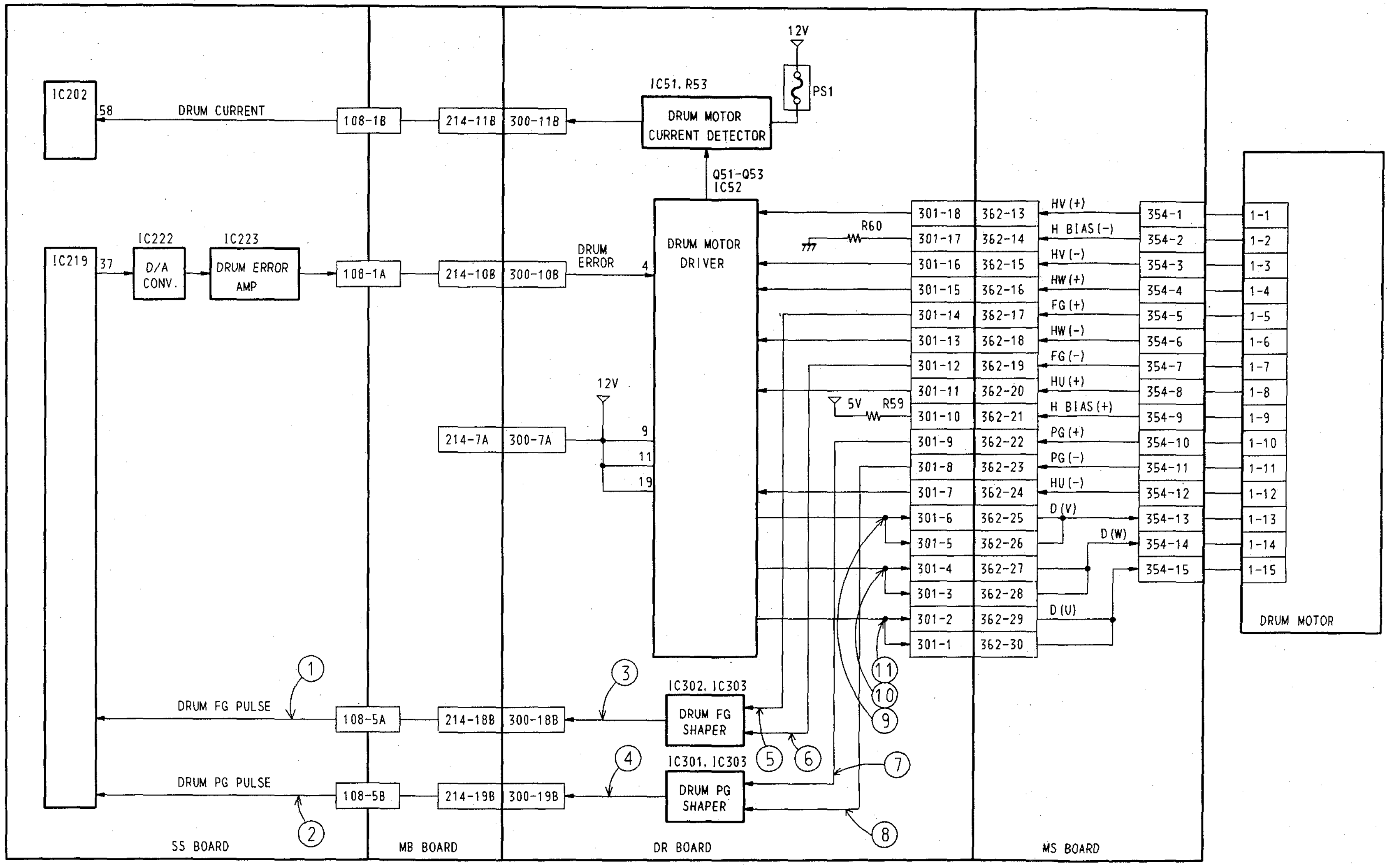
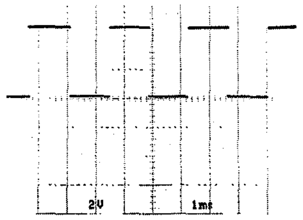


• **DRUM**


IC202
58
DRUM CURRENT
108-1B
214-11B
300-11B
IC51, R53
DRUM MOTOR CURRENT DETECTOR
12V
PS1
Q51-Q53
IC52
DRUM MOTOR DRIVER
IC219
37
IC222
D/A CONV.
IC223
DRUM ERROR AMP
108-1A
214-10B
300-10B
DRUM ERROR
4
12V
214-7A
300-7A
9
11
19
R60
5V
R59
301-18
301-17
301-16
301-15
301-14
301-13
301-12
301-11
301-10
301-9
301-8
301-7
301-6
301-5
301-4
301-3
301-2
301-1
362-13
362-14
362-15
362-16
362-17
362-18
362-19
362-20
362-21
362-22
362-23
362-24
362-25
362-26
362-27
362-28
362-29
362-30
HV (+)
H BIAS (-)
HV (-)
HW (+)
FG (+)
HW (-)
FG (-)
HU (+)
H BIAS (+)
PG (+)
PG (-)
HU (-)
D (V)
D (W)
D (U)
354-1
354-2
354-3
354-4
354-5
354-6
354-7
354-8
354-9
354-10
354-11
354-12
354-13
354-14
354-15
1-1
1-2
1-3
1-4
1-5
1-6
1-7
1-8
1-9
1-10
1-11
1-12
1-13
1-14
1-15
DRUM MOTOR
①
DRUM FG PULSE
108-5A
214-18B
300-18B
③
IC302, IC303
DRUM FG SHAPER
⑤
⑥
⑪
⑩
⑨
⑦
④
IC301, IC303
DRUM PG SHAPER
DRUM PG PULSE
108-5B
214-19B
300-19B
②
⑧
SS BOARD
MB BOARD
DR BOARD
MS BOARD

①③



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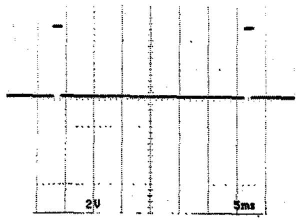

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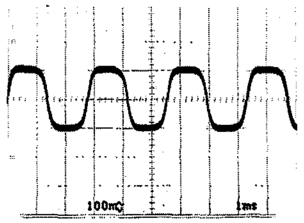

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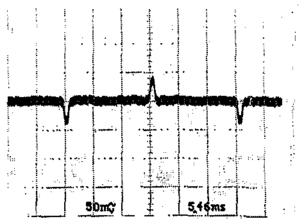

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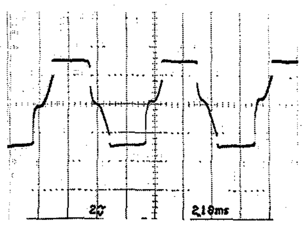
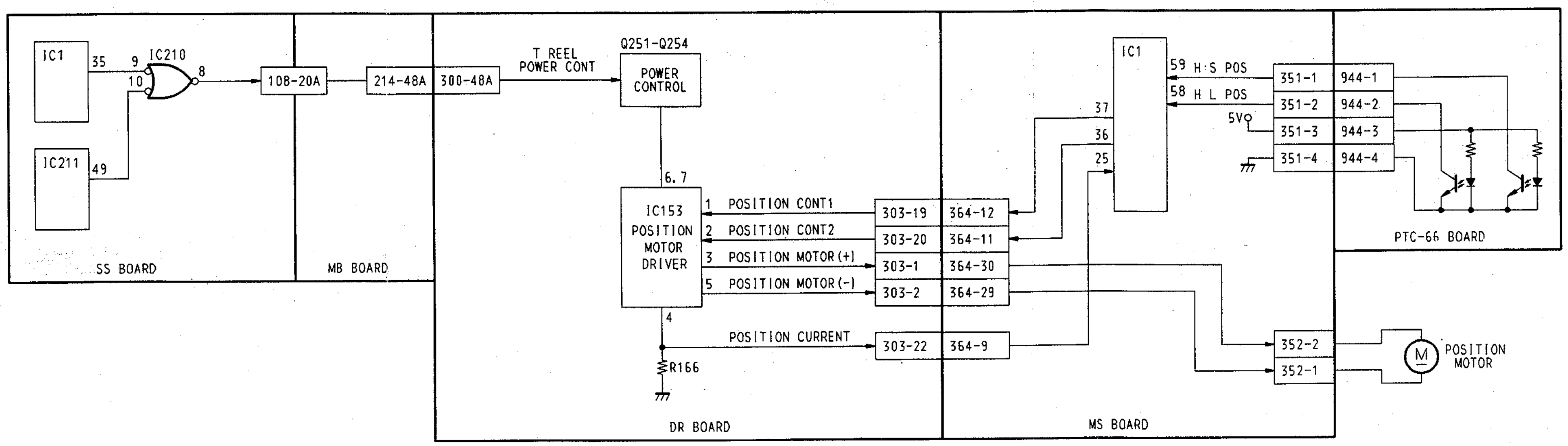
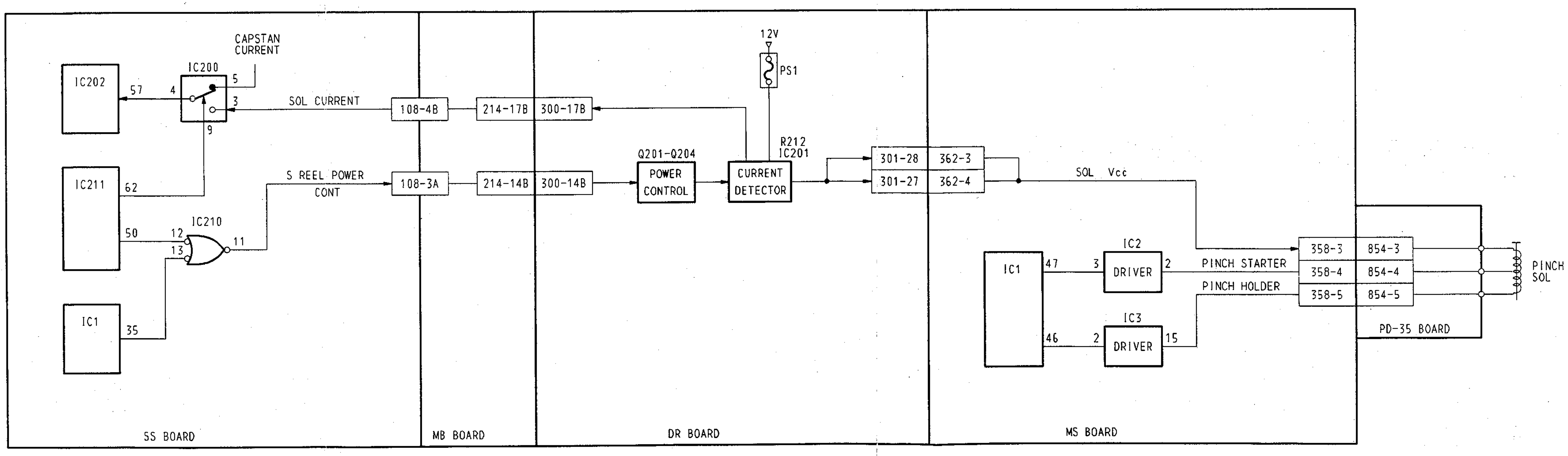


• REEL POSITION


IC1
35
9
10
IC210
8
IC211
49
108-20A
SS BOARD
MB BOARD
214-48A
300-48A
T REEL
POWER CONT
Q251-Q254
POWER
CONTROL
6, 7
IC153
POSITION
MOTOR
DRIVER
1 POSITION CONT1
2 POSITION CONT2
3 POSITION MOTOR (+)
5 POSITION MOTOR (-)
4
POSITION CURRENT
R166
303-19
303-20
303-1
303-2
303-22
364-12
364-11
364-30
364-29
364-9
DR BOARD
IC1
37
36
25
59 H·S POS
58 H L POS
5V
351-1
351-2
351-3
351-4
944-1
944-2
944-3
944-4
352-2
352-1
MS BOARD
PTC-66 BOARD
M
POSITION
MOTOR

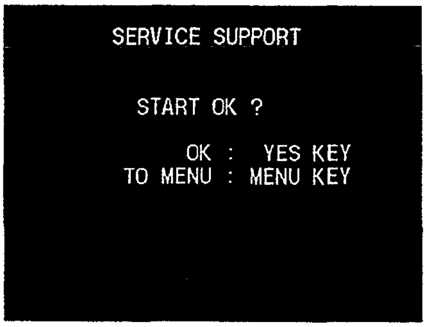
• PINCH


IC202
57
4
IC200
5
3
9
CAPSTAN
CURRENT
SOL CURRENT
IC211
62
50
12
13
IC210
11
IC1
35
S REEL POWER
CONT
108-4B
108-3A
SS BOARD
214-17B
214-14B
300-17B
300-14B
MB BOARD
12V
PS1
R212
IC201
Q201-Q204
POWER
CONTROL
CURRENT
DETECTOR
DR BOARD
301-28
301-27
362-3
362-4
SOL Vcc
IC1
47
46
IC2
3
DRIVER
2
IC3
2
DRIVER
15
PINCH STARTER
PINCH HOLDER
358-3
358-4
358-5
854-3
854-4
854-5
PD-35 BOARD
PINCH
SOL
MS BOARD

MANUAL EJECT

The operating method to take out the tape when the normal EJECT is impossible is displayed.

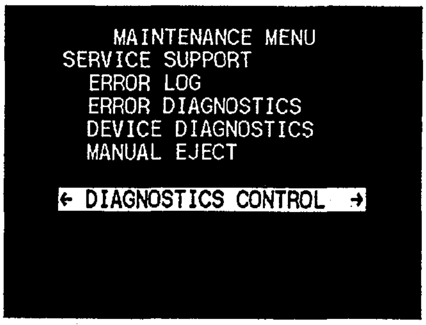
Select the SET (YES) key, and the "MANUAL EJECT" is entered.
Take out the tape according to the instruction on screen.



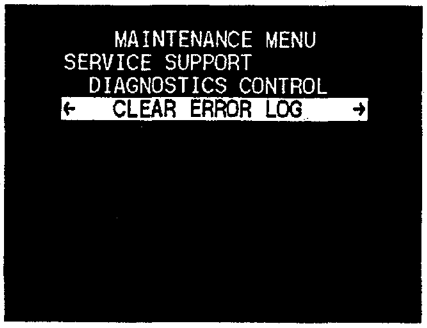
```
        SERVICE SUPPORT

          START OK ?

               OK :  YES KEY
         TO MENU : MENU KEY
```

DIAGNOSTICS CONTROL

This item has the function to delete the all ERROR LOG with memorized.

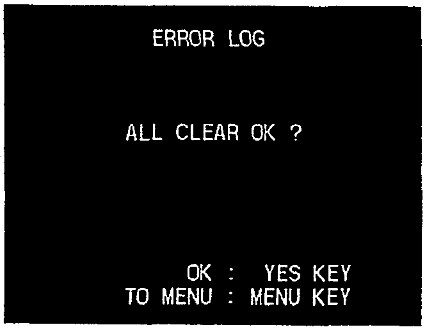


```
      MAINTENANCE MENU
  SERVICE SUPPORT
    ERROR LOG
    ERROR DIAGNOSTICS
    DEVICE DIAGNOSTICS
    MANUAL EJECT

 ← DIAGNOSTICS CONTROL  →
```



```
      MAINTENANCE MENU
  SERVICE SUPPORT
    DIAGNOSTICS CONTROL
 ←    CLEAR ERROR LOG   →
```

Press the YES key to delete the all ERROR LOG with memorized.
To stop deleting, press the MENU key.



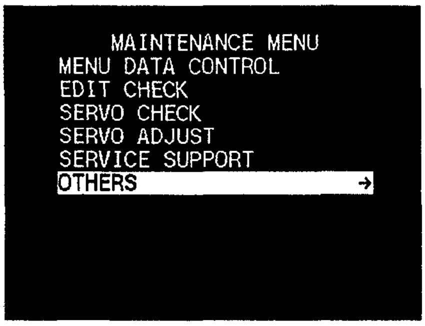
```
           ERROR LOG


         ALL CLEAR OK ?



               OK :  YES KEY
         TO MENU : MENU KEY
```

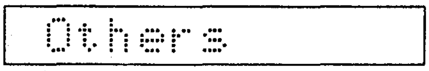
4-7. OTHERS

In this item, it is able to check the SOFTWARE version, CF data and display contents of memory, etc.

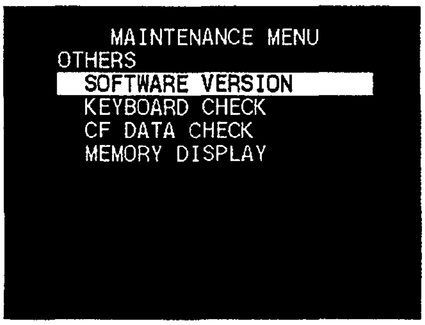
[Procedure]

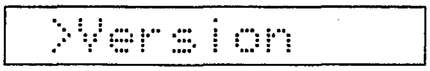
1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.


MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS →



3. Press the (→) key.
   Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.


MAINTENANCE MENU
OTHERS
SOFTWARE VERSION
KEYBOARD CHECK
CF DATA CHECK
MEMORY DISPLAY



4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.
   Then the menus of the lower levels are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.
   (Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

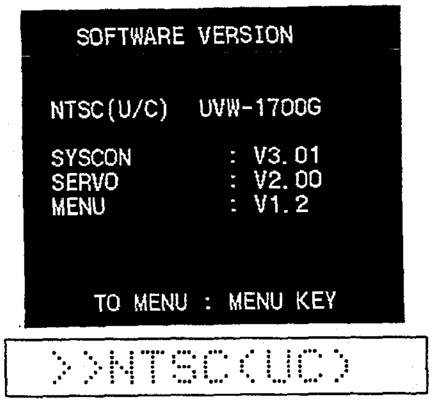
SOFTWARE VERSION

Press the (←) key or RESET key to return to the maintenance menu.

NTSC (U/C) : NTSC system (For UC)
PAL : PAL system

UVW-1700G
UVW-1700GP
UVW-1400A
UVW-1400AP

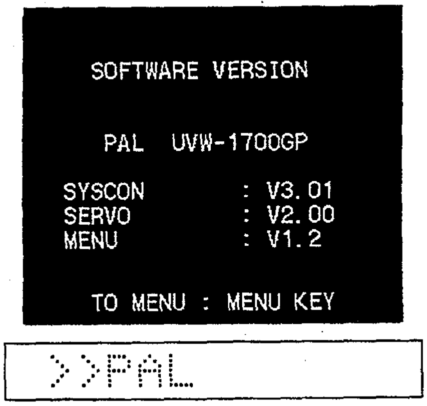
SYSCON : Version of IC4 on the SS-61 board
SERVO : Version of IC212 on the SS-61 board
MENU : Version of initial setup menu



```
SOFTWARE VERSION

NTSC(U/C)   UVW-1700G

SYSCON          : V3.01
SERVO           : V2.00
MENU            : V1.2

  TO MENU : MENU KEY
```

```
>>NTSC(UC)
```

* The content of display on the time counter can be changed by pressing the (↑) and (↓) keys.
Returns to the maintenance menu using the (←) key or RESET key.



```
   SOFTWARE VERSION

  PAL  UVW-1700GP

SYSCON          : V3.01
SERVO           : V2.00
MENU            : V1.2

  TO MENU : MENU KEY
```

```
>>PAL
```

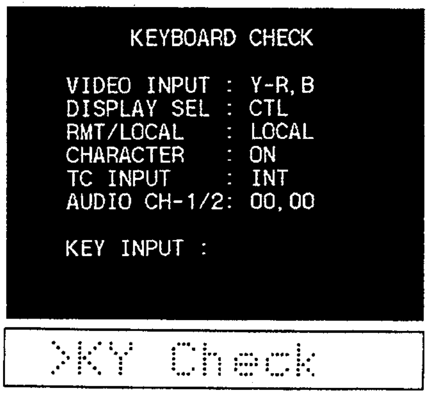
KEYBOARD CHECK

In this mode, it is able to check the key on the keyboard, slide switch and time counter.

1. Press the SET (YES) key, to enter into the KEYBOARD CHECK.

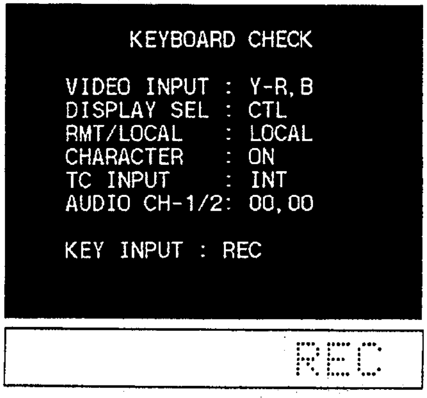
Note : Once a machine enters the KEYBOARD CHECK mode, it cannot exit without turning off the power.

2. The monitor displays settings of all switches on the sub control panel. All dots of the time counter light.



```
KEYBOARD CHECK

VIDEO INPUT : Y-R,B
DISPLAY SEL : CTL
RMT/LOCAL   : LOCAL
CHARACTER   : ON
TC INPUT    : INT
AUDIO CH-1/2: 00,00

KEY INPUT :
```

```
>KY Check
```

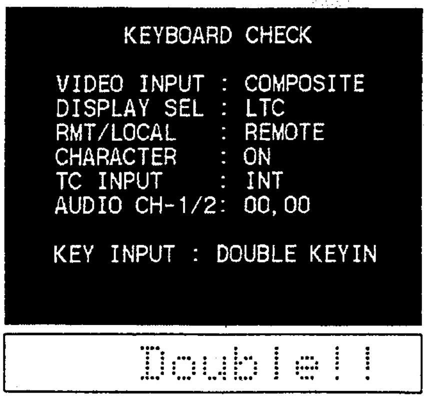


```
KEYBOARD CHECK

VIDEO INPUT : Y-R,B
DISPLAY SEL : CTL
RMT/LOCAL   : LOCAL
CHARACTER   : ON
TC INPUT    : INT
AUDIO CH-1/2: 00,00

KEY INPUT : REC
```

```
REC
```

3. If any key is pressed or switch setting is changed, the condition that all displays are lighting is canceled. Information about the changed switch or the pressed key is displayed. If two or more switches are pressed at the same time, "DOUBLE KEYIN" is displayed.

   ＊ Turn OFF the power to stop this mode.



```
KEYBOARD CHECK

VIDEO INPUT : COMPOSITE
DISPLAY SEL : LTC
RMT/LOCAL   : REMOTE
CHARACTER   : ON
TC INPUT    : INT
AUDIO CH-1/2: 00,00

KEY INPUT : DOUBLE KEYIN
```

```
Double!!
```

[The symptoms which seem to be defective.]

① Display function of the time counter is defective.
- There is a segment which does not light even in the mode of all lamps lighting.
- There is an abnormally bright or dark segment.
- When any key is not pressed, no display is expected, but a segment is lighting.

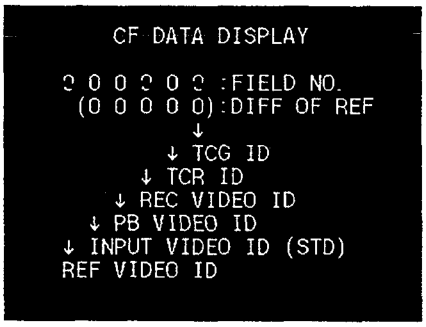
② Key enter is defective.
- Any key is not pressed, but a key name or "DOUBLE" is displayed.
  (When key setting is changed, the switch name is kept displayed. This is not trouble.)
- A key is pressed, but the key name is not displayed.

③ Key illumination is defective.
- A key is pressed, but the key is not illuminated.
- Any key is not pressed, but a key is illuminated.

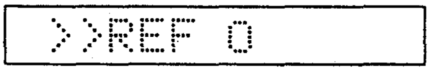
④ Switch input is defective.
- A switch setting is changed, but the setting name is not displayed.

CF DATA CHECK

In this mode video signal and CF data is displayed.
Select the appropriate time counter item with the (↑), (↓) keys.



```
CF DATA DISPLAY

0 0 0 0 0 0 :FIELD NO.
 (0 0 0 0 0):DIFF OF REF
           ↓
         ↓ TCG ID
       ↓ TCR ID
     ↓ REC VIDEO ID
   ↓ PB VIDEO ID
 ↓ INPUT VIDEO ID (STD)
REF VIDEO ID
```



```
>>REF 0
```

CF data: 0, 1, 2, 3 (field)

* Due to the display timings, only the even fields are displayed.

- DIFF OF REF : Display of field number only is not enough for identification of relative phase relationship. The difference from the REF. VIDEO ID is displayed in ( ).

REF VIDEO ID	: The CF field Number of REF video signal.
INPUT VIDEO ID	: The CF field number of the input VIDEO signal. The signals other than the composite signal has no CF information. "0" is displayed. When the input video signal is the composite signal, the STANDARD/ NONSTANDARD information of the input signal is also displayed. (only on the monitor)
PB VIDEO ID	: The signals other than the composite signal has no CF information. In VIDEO EE mode, the CF field number of the input video signal is displayed.
REC VIDEO ID	: The CF field number of the video signal to be recorded on tape during record mode.
TCR VIDEO ID	: "0" is displayed. Playback TC signal.
TCG ID	: The CF field number of the TC data generated by TC generator.

MEMORY DISPLAY

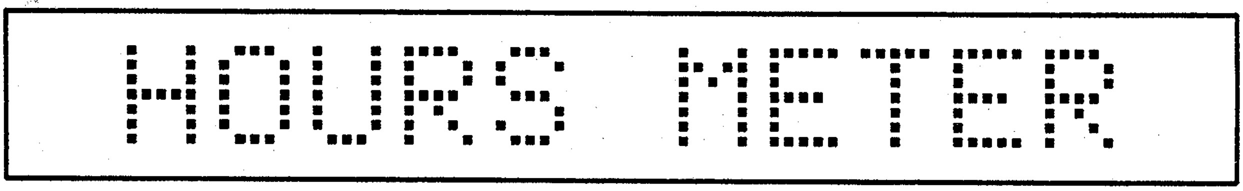
* This menu is Factory use.

SECTION 5
PERIODIC MAINTENANCE AND INSPECTION

5-1. HOURS METER

The data values of the hours meter are displayed on the monitor and time counter display.
Therefore, the hours meter values are not displayed unless power of the unit is turned on.
It is recommended to use this hours meter as the reference of the periodic maintenance.

HOURS METER

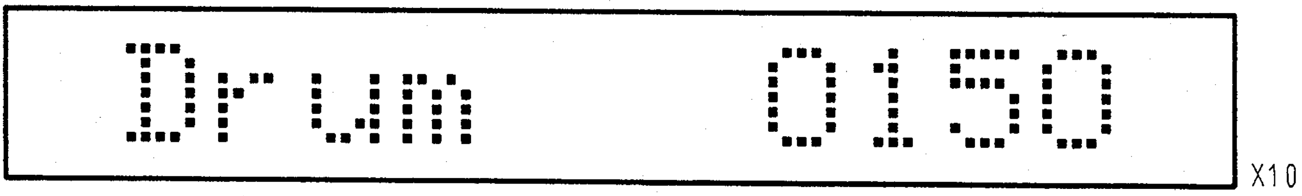


There are 4 display modes in this hours meter, and each mode displays the total hours or total number of the movements.
T2, T3 and CT have two types of meter: one meter can be reset and the other can not be reset.

Note : The actual hours or number of the movements are ten times of the displayed number.

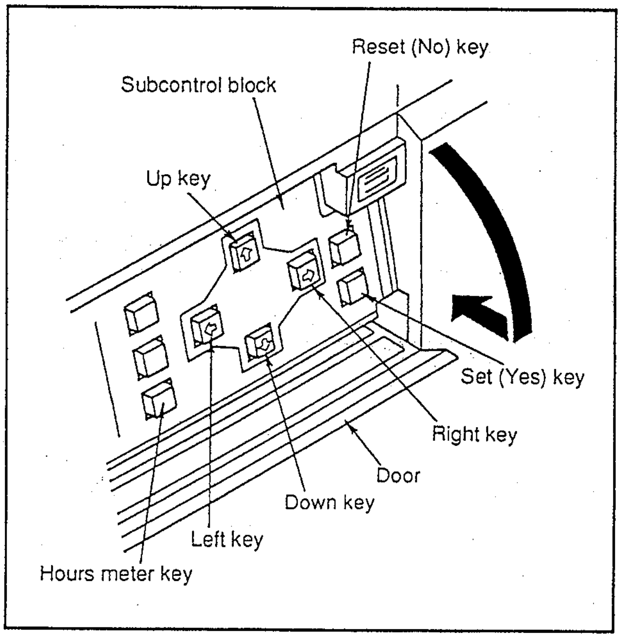
Mode	Contents Displayed
T1 : OPERATION	Total hours while the power is turned on.
T2 : DRUM ROTATION	Total hours while the drum is rotating in the thread-end mode.
T3 : TAPE RUNNING	Total hours while the tape is running in each mode of fast forward, rewind, playback, search, recording and editing. (Except for the still picture mode during searching.)
CT : THREADING	Total number of times of threading and unthreading.

Example : The following indicates that the total hours of drum rotation is 1500 hours in the threading end status.



5-1-1. Hours Meter Display

1. Open the door of the subcontrol block as illustrated in the figure.

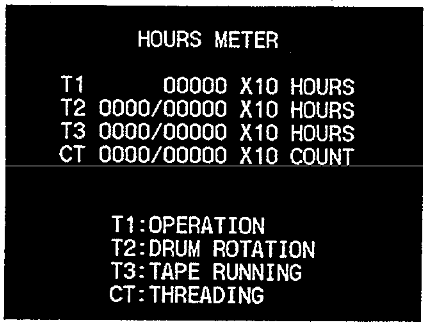


2. Press the hours meter key.
3. The monitor screen displays the hours meter values of T1, T2, T3 and CT.
4. The time counter only displays one of T1, T2, T3 or CT. However, it is possible to display the other item's value by pressing the up or down key.
5. In the mode selection of T2, T3 or CT, the hours meter value which can be reset is displayed at first.
6. The hours meter value which cannot be reset is displayed on the right while the right key is held down.

Note : If the hours meter value exceeds the limit of the display, "_ _ _ _ _ _" will be displayed.

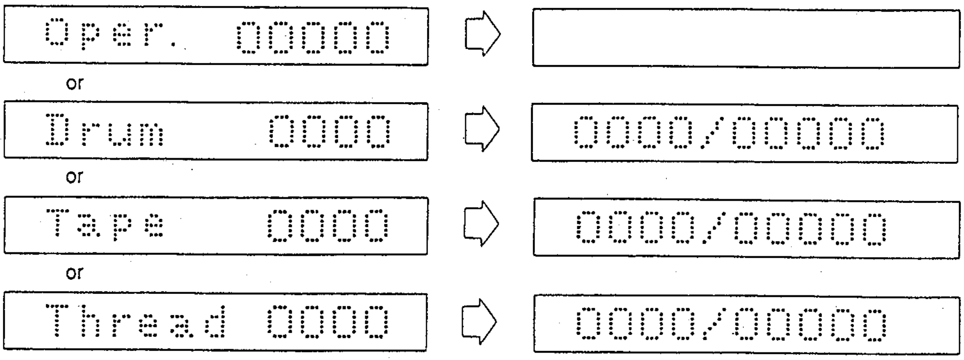
7. Press the hours meter key to return to the initial mode.

[Monitor Screen]



```
HOURS METER

T1       00000 X10 HOURS
T2  0000/00000 X10 HOURS
T3  0000/00000 X10 HOURS
CT  0000/00000 X10 COUNT

T1:OPERATION
T2:DRUM ROTATION
T3:TAPE RUNNING
CT:THREADING
```

[Counter Display]

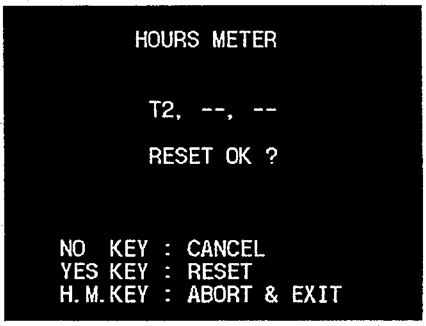


```
Oper.   00000  ⇨
or
Drum     0000  ⇨  0000/00000
or
Tape     0000  ⇨  0000/00000
or
Thread   0000  ⇨  0000/00000
```

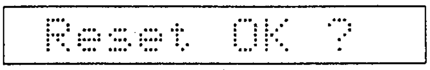
5-1-2. Hours Meter RESET

1. Turn on the switch S201-1 on the SS-61 board. (Refer to section 6-1.)
2. Press the hours meter key while holding down the left key.
3. Select the item to be reset with the up or down key.
4. Press the reset key. "0000" appears on the display and flashes.
5. Press the set key. The monitor screen confirms whether it is permitted to reset or not.
6. If it is permitted to reset, press the set key again to terminate the hours meter display mode.

Precaution : While data is being saved, the following message is displayed.
If the power is tuned off while this message is displayed, the unit may not be reset. Do not turn off the power until the message disappears.

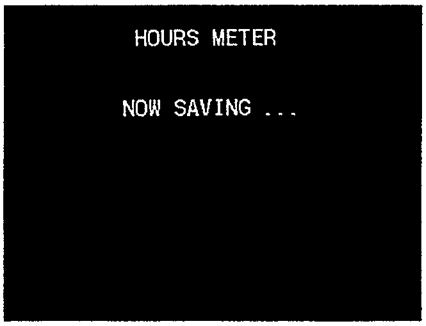


```
HOURS METER

T2, --, --

RESET OK ?

NO  KEY : CANCEL
YES KEY : RESET
H.M.KEY : ABORT & EXIT
```

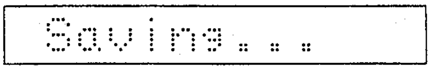


```
Reset OK ?
```

7. Turn off the switch S201-1 on the SS-61 board. (Refer to section 6-1.)



```
HOURS METER

NOW SAVING ...
```



```
Saving...
```

5-2. MAINTENANCE AFTER SERVICING UNIT

After servicing the unit, perform the following maintenance regardless of the hours that the unit is used.

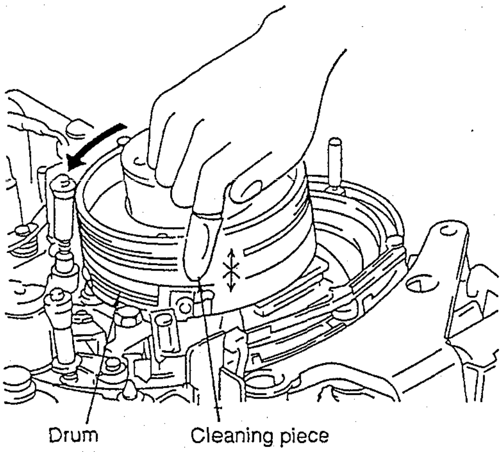
1. Cleaning of the video head or stationary heads.
   (For how to clean, refer to sections 5-2-1 and 5-2-2.)
2. Cleaning of the tape contacting surface.
   (For how to clean, refer to section 5-2-3.)

Precaution : Insert the cassette tape after the cleaning fluid is completely dried.

5-2-1. Video Head Cleaning

Put the cleaning piece moistened with the cleaning fluid to the head lightly, and slowly rotate the drum manually to clean the head.

Do not move the cleaning piece vertically.



Precaution : Do not move the cleaning piece vertically to the drum rotating direction (vertical direction to the drum) during cleaning.
Turn off the power during cleaning.

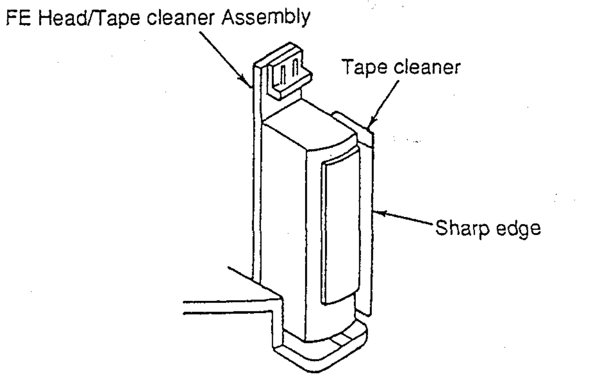
5-2-2. STATIONARY Head Cleaning

Clean the Audio/TC Head, CTL Head and FE Head/Tape cleaner Assembly with the cleaning piece moistened with the cleaning fluid.

5-2-3. Tape Contacting Surface Cleaning

Clean the parts which contact the tape, such as Tape Guides, Upper/Lower Drums, Capstan, Pinch Roller, Tape Cleaner, with the cleaning piece moistened with the cleaning fluid.

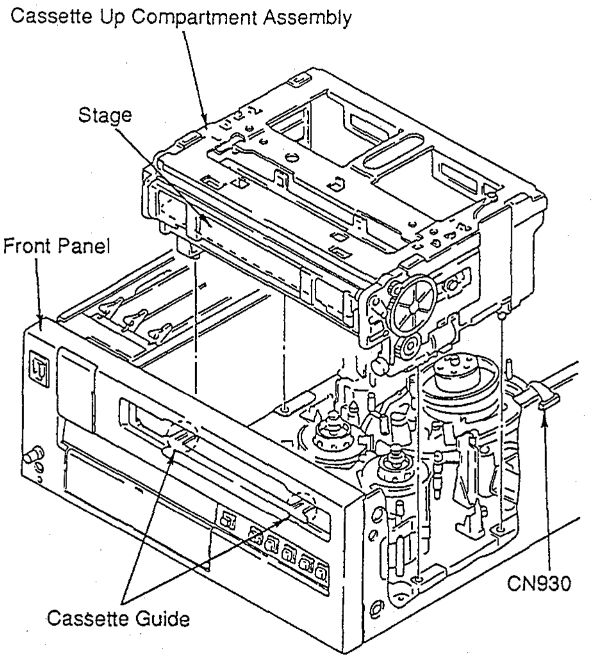
Precaution : When cleaning the tape cleaner, be careful of the sharp edge of the tape cleaner.



5-2-4. Cassette Up Compartment Entrance Cleaning

Clean the cassette guides and their surroundings and the entire stage of the Cassette Up Compartment with the cleaning piece moistened with the cleaning fluid.

Precaution : Before cleaning, remove the Cassette Up Compartment so as not to drop some parts into the unit.



5-3. PERIODIC INSPECTION TABLE

The hours shown in the table are not the period of guarantee. Refer to this table in order to operate the functions and optimum performance of the unit and extend the life of the unit and tapes when planning the maintenance schedule.
The time of the parts replacement depends on the environment and condition that the unit is used.

☆ : Replace the parts ◇ : Check (Adjustment)

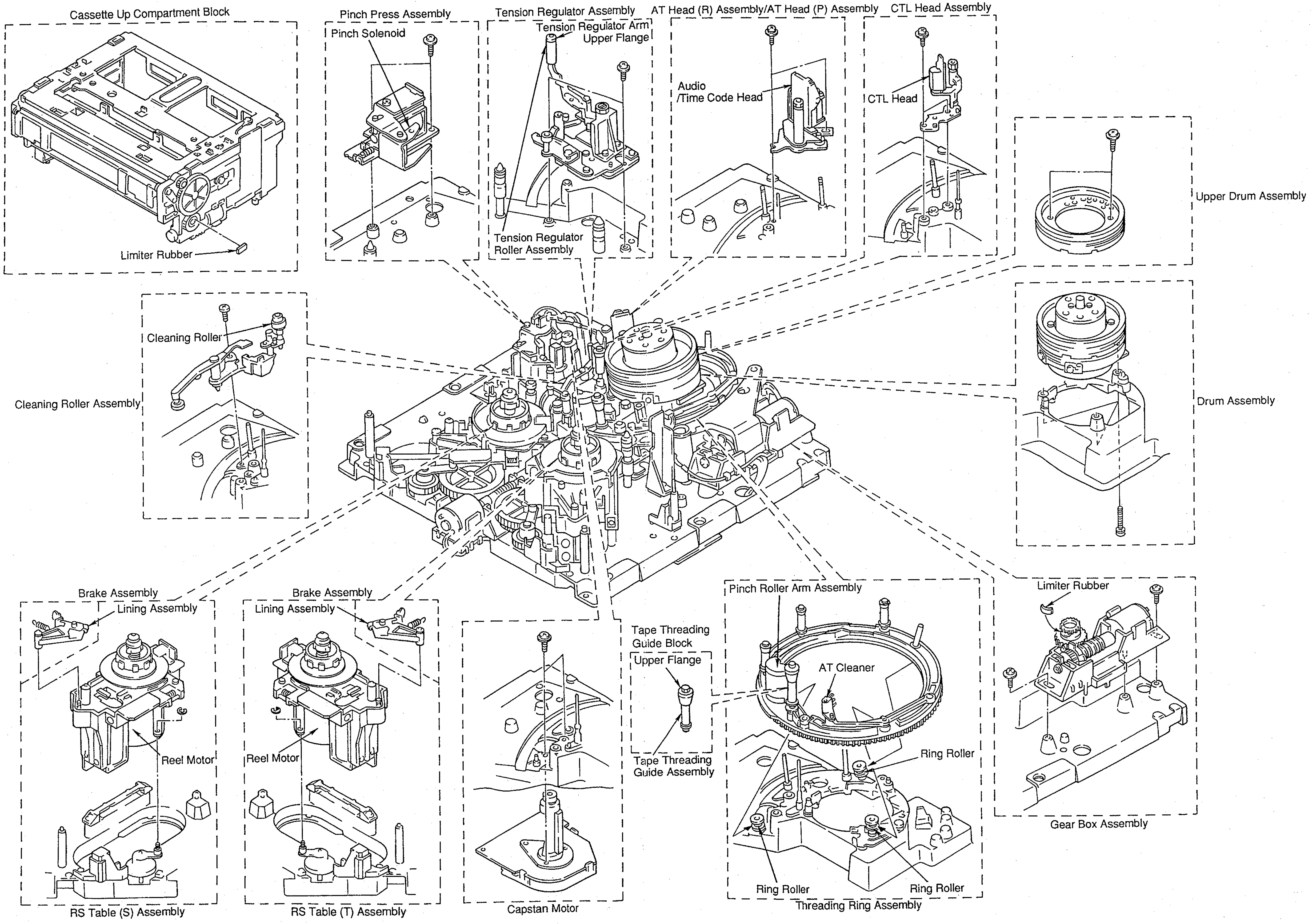
	Maintenance Parts			Hours Meter	Maintenance Time (H)								Remarks		
	Maintenance Item	Parts No.	Q' TY	Display Mode	750	1500	2250	3000	3750	4500	5250	6000	Exploded View Page	Replacement Procedure	Application/ Remarks
Drum Block	Upper Drum Assembly	A-8260-975-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1700GP.
	Upper Drum Assembly	A-8263-057-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1400AP.
	Drum Assembly	A-8260-974-	1	T2	—	—	—	☆	—	—	—	☆	18-10	Refer to section 6-3.	For UVW-1700GP.
	Drum Assembly	A-8263-058-	1	T2	—	—	—	☆	—	—	—	☆	18-10	Refer to section 6-3.	For UVW-1400AP.
Drive Block	Pinch Solenoid	1-454-338-11	1	T2	—	—	—	—	—	—	—	☆	18-14	Refer to section 6-17	
	Lining Assembly (S and T)	X-3167-231-	2	T2	—	—	—	◇	—	—	—	◇	18-4, 8	Refer to section 6-13	No problem when there is a clearance.
	Reel Motor (S and T)	1-698-231-11	2	T2	—	—	—	—	—	—		◇	18-4, 8	Refer to section 6-9.	
	Gear Box Block Limiter Rubber	3-180-653-	1	CT	Replace at 100,000 times								18-6	——	
Tape Path Block	CTL Head	8-825-554-83	1	T2	—	—	—	☆	—	—	—	☆	18-14	Refer to section 6-22.	
	Audio/Time Code Head	8-825-779-11	1	T2	—	—	—	◇	—	—	—	◇	18-14	Refer to section 6-24.	
	Capstan Motor	1-698-179-11	1	T2	—	—		☆				☆	18-10	Refer to section 6-21.	
	Pinch Roller Arm Assembly	X-3717-215-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-15.	
	Tape Threading Guide Assembly	X-3167-224-	1	T2				◇				◇	18-6	Refer to section 6-30.	
	Tape Threading Guide Upper Flange	3-182-340-	1	T2				☆				☆	18-6	Refer to section 6-31.	
	Tension Regulator Roller Assembly	X-3675-851-	1	T2	—	—		◇	—			◇	18-10	Refer to section 6-35.	
	Tension Regulator Roller Upper Flange	3-677-752-	1	T2	—	—		☆				☆	18-10	Refer to section 6-34.	
Cleaner	Cleaning Roller	X-3167-232-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-26.	
	AT Cleaner	3-182-389-	1	CT	Replace at 100,000 times								18-6	Refer to section 6-25.	
Others	Cassette Up Compartment Limiter Rubber	3-181-431-	1	CT	Replace at 200,000 times								18-16	——	

T1 : OPERATION T2 : DRUM ROTATION T3 : TAPE RUNNING CT : THREADING

Note 1 : The life of the heads may be shortened when the unit is used in the place where there is high temperature, humidity or dusty. Therefore, use the unit in an air conditioned room and not in dusty areas. It is recommended to stock the tape at normal temperature and humidity.

Note 2 : When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced.

5-3-1. Maintenance Item Configuration Figure


Cassette Up Compartment Block
Limiter Rubber
Pinch Press Assembly
Pinch Solenoid
Tension Regulator Assembly
Tension Regulator Arm
Upper Flange
Tension Regulator
Roller Assembly
AT Head (R) Assembly/AT Head (P) Assembly
Audio
/Time Code Head
CTL Head Assembly
CTL Head
Upper Drum Assembly
Cleaning Roller
Cleaning Roller Assembly
Drum Assembly
Brake Assembly
Lining Assembly
Reel Motor
RS Table (S) Assembly
Brake Assembly
Lining Assembly
Reel Motor
RS Table (T) Assembly
Capstan Motor
Tape Threading
Guide Block
Upper Flange
Tape Threading
Guide Assembly
Pinch Roller Arm Assembly
AT Cleaner
Ring Roller
Ring Roller
Ring Roller
Threading Ring Assembly
Limiter Rubber
Gear Box Assembly

SECTION 6
REPLACEMENT OF MECHANICAL PARTS

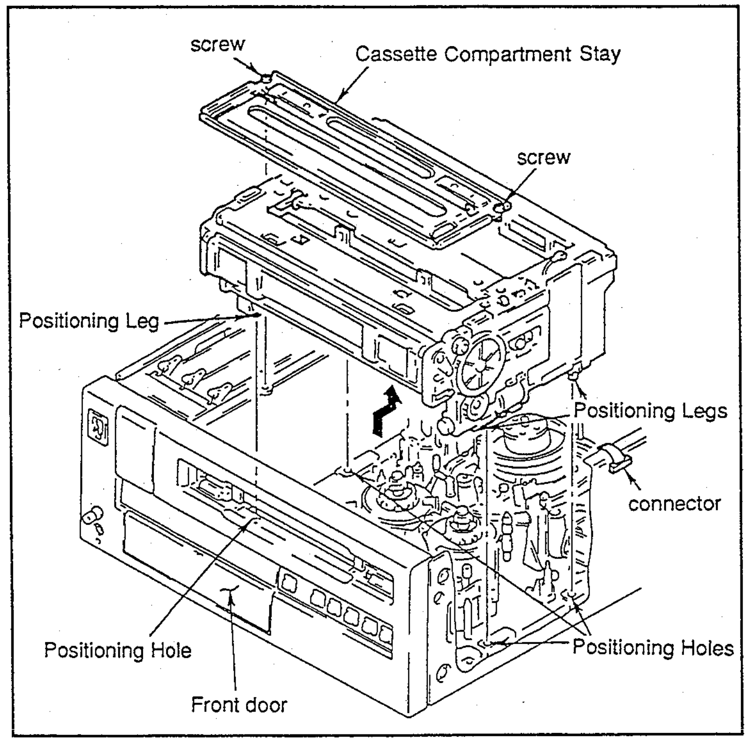
6-1. GENERAL INFORMATION FOR PARTS REPLACEMENT/ADJUSTMENT

6-1-1. Preparation Before Parts Replacement

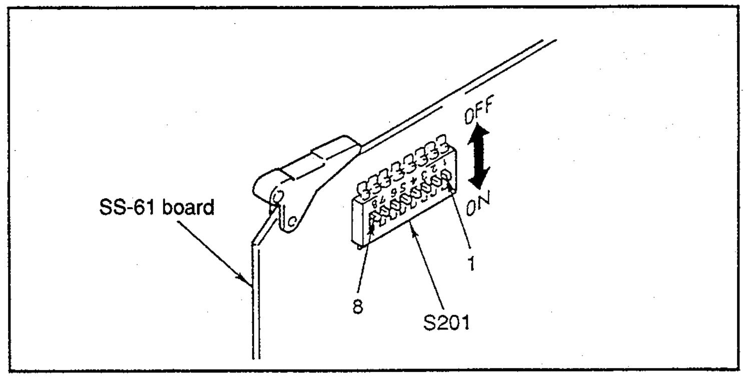
1. Use of cassette compartment
   When replacing mechanical parts and adjusting the mechanism, remove the cassette compartment from the unit unless otherwise specified.

Cassette compartment removal

1) Remove the top panel.
2) Unplug the connectors connected to the cassette compartment.
3) Loosen the two screw fixing the cassette compartment stay. The stays have the drop-safe metals of the screws so the screws cannot be removed from the cassette compartment stays.
4) Remove the cassette compartment from the unit.



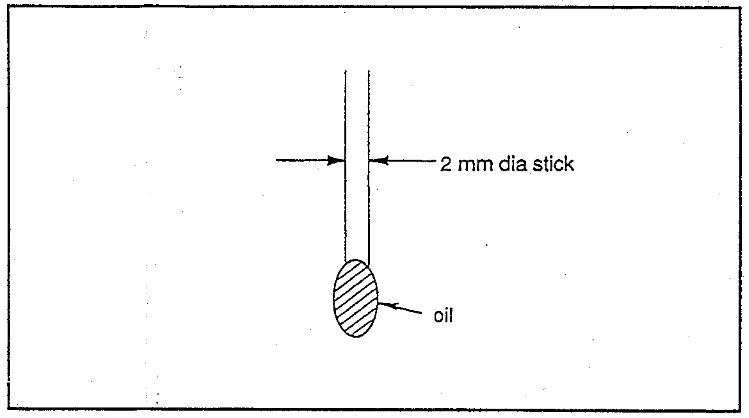
2. How to operate the VTR without cassette compartment.
   When the connectors are unplugged from the cassette compartment, the protection circuit works. To operate the VTR without cassette compartment, perform the followings.
   1) Set the switch S201-4 on the SS-61 board to on. This disables the function of the protection circuit. The VTR can be operated without cassette compartment or without a cassette tape inserted in the unit.
   2) Set the switch S201-1 on the SS-61 board to on to enter the adjustment mode. Switching of L and S positions of RS table becomes possible.



The procedure for this selection is as follows. Open the front door and press the Right key once to move the RS table to either S cassette or L cassette position. When pressed again, it returns to the original position.

Precaution : After the adjustment is completed, be sure to set the switches S201-1 and -4 on the SS-61 board to off positions.

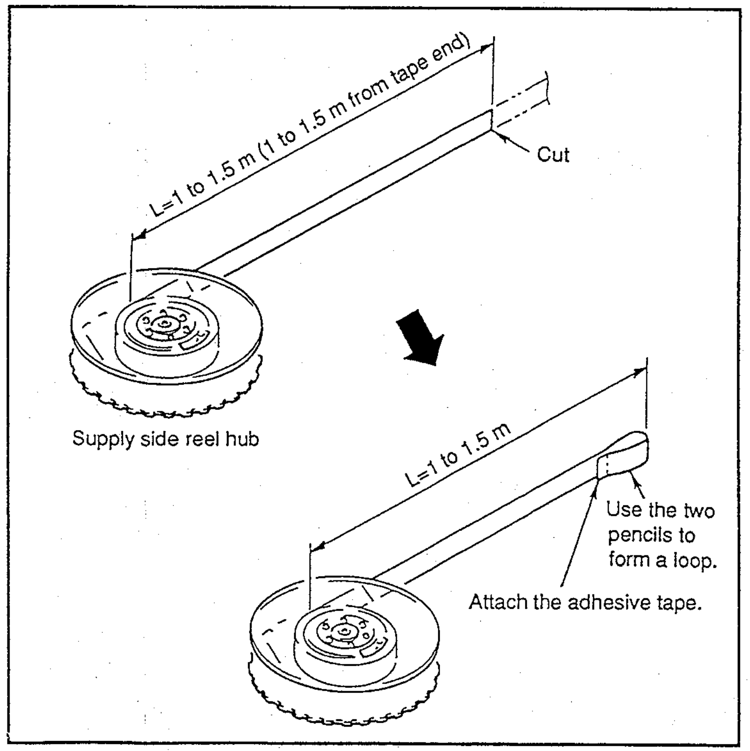
3. Oil
   Sony parts no. 7-661-018-18
   Use the specified oil for parts replacement and others. Different type of oil has the different viscosity and ingredients. It can cause severe troubles in the unit.
   Do not use oil containing dust, etc., that may injure spindles and bearings. It can cause severe troubles.
   A drop of oil is defined as follows.
   The amount of oil on the tip of a stick having 2 mm diameter.



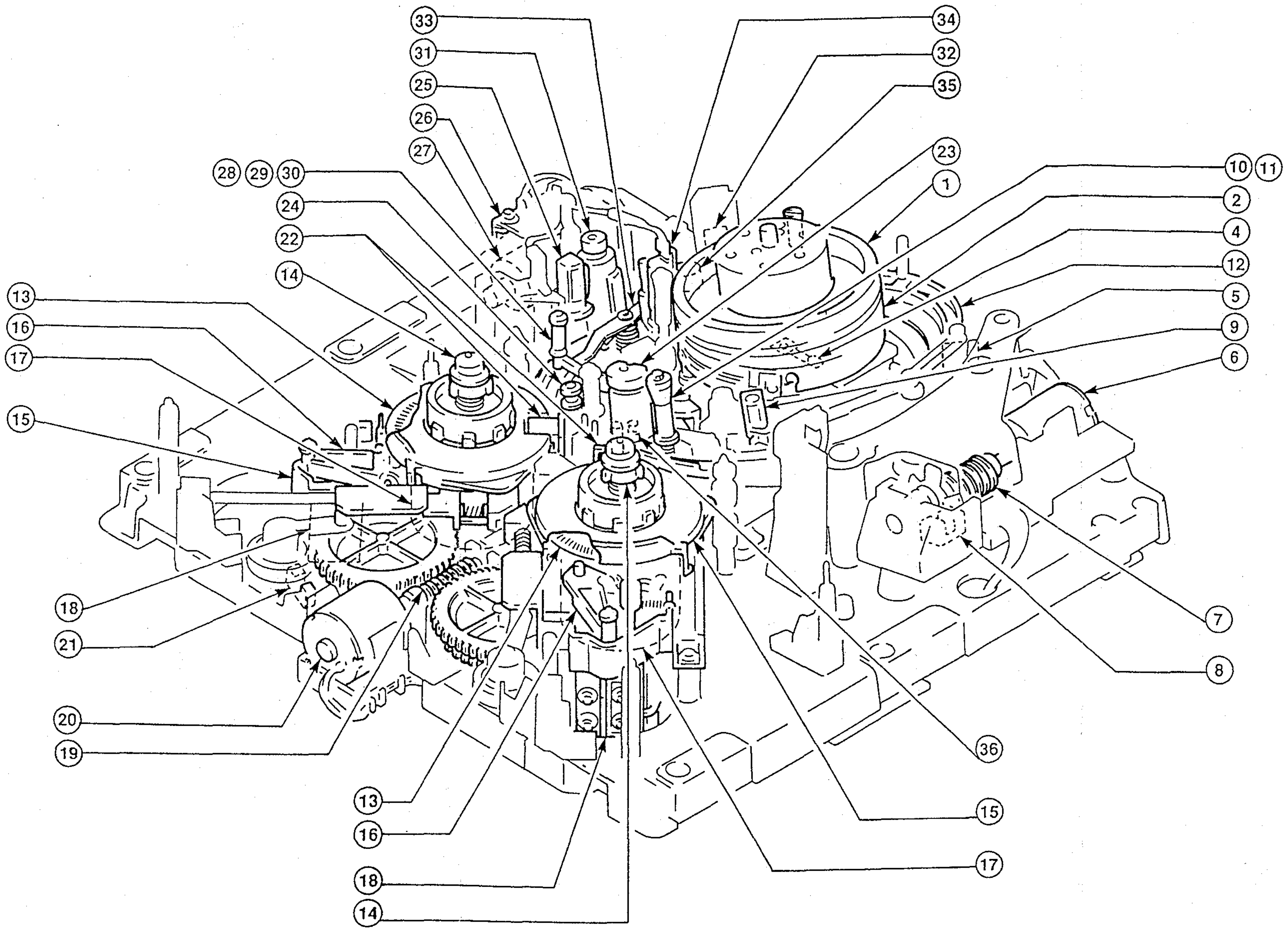
4. Grease
   Sony parts no. 7-662-010-04
   (grease type SGL-505)
   Use the specified grease applied to the movable parts. Different type of grease has the different viscosity and ingredients. It can cause severe troubles in the unit.
   Do not use grease containing dust, etc., that may injure spindles and bearings. It can cause severe troubles.

   Amount of Grease to Apply
   Apply grease so that a thin film is form on the surface.
   Wipe the extra grease bulged outside the coating surface with soft cloth.

5. Fabricating the Tension Adjustment Tape.
   Disassembly the S cassette tape (20 minute or 30 minute use). Obtain the supply side reel hub. Fabricate the tension adjustment tape as shown in the figure. This tape is used for tension measurement.


L=1 to 1.5 m (1 to 1.5 m from tape end)
Cut
Supply side reel hub
L=1 to 1.5 m
Use the two pencils to form a loop.
Attach the adhesive tape.

6-1-2. REPLACEMENT PARTS INDEX



No.	Parts Name	Section No.	Page	Exploded View Page
1	Upper Drum	6-2	6-3	18-10
2	Drum Assembly	6-3	6-8	18-10
—	————	—	—	—
4	Guide Shaft Grounding Assembly	6-4	6-12	18-10
5	Ring Position Detecting Element (PTC-68 M't)	6-28	6-60	18-10
6	Gear Box Motor	6-18	6-44	18-6
7	Worm Gear (gear box)	6-19	6-47	18-6
8	Gear Box Motor Rotation Detecting Element (PTC- 67 M't)	6-20	6-49	18-6
9	AT Cleaner	6-25	6-57	18-6
10	Tape Threading Guide	6-30	6-62	18-6
11	Tape Threading Guide Upper Flange	6-31	6-63	18-6
12	Threading Ring Assembly	6-33	6-65	18-6
13	Reel Disc (S, T)	6-7	6-18	18-4, 8
14	Reel Table Assembly	6-5	6-13	18-4, 8
15	RS Table (S, T) Assembly	6-8	6-20	18-4, 8
16	Brake Lining Assembly (S, T)	6-13	6-34	18-4, 8
17	Reel Motor (S, T)	6-9	6-25	18-4, 8
18	Brake Solenoid (S, T)	6-14	6-38	18-4, 8
19	Worm Gear (LS motor)	6-11	6-32	18-8
20	Reel Position Motor	6-10	6-30	18-8
21	Reel Position Detecting Element (PTC-66 M't)	6-12	6-33	18-12
22	Reel Rotation Detecting Element (SE-207 M't)	6-6	6-17	18-4, 8
23	Pinch Roller Assembly	6-15	6-39	18-6
24	Ring Roller (three points)	6-29	6-61	18-6
25	FE Head Block/Tape Cleaner Assembly	6-23	6-54	18-14
26	Pinch Press Assembly	6-16	6-41	18-14
27	Pinch Solenoid	6-17	6-42	18-14
28	Tension Regulator Assembly	6-36	6-70	18-10
29	Tension Regulator Roller Assembly	6-35	6-69	18-10
30	Tension Regulator Arm Upper Flange	6-34	6-68	18-10
31	Capstan Motor	6-21	6-50	18-10
32	Audio/TC Head	6-24	6-55	18-14
33	Roller for Cleaning Roller	6-27	6-59	18-6
34	CTL Head	6-22	6-52	18-14
35	Cleaning Roller	6-26	6-58	18-6
36	Tension Regulator Return Arm Assembly	6-38	6-82	18-10

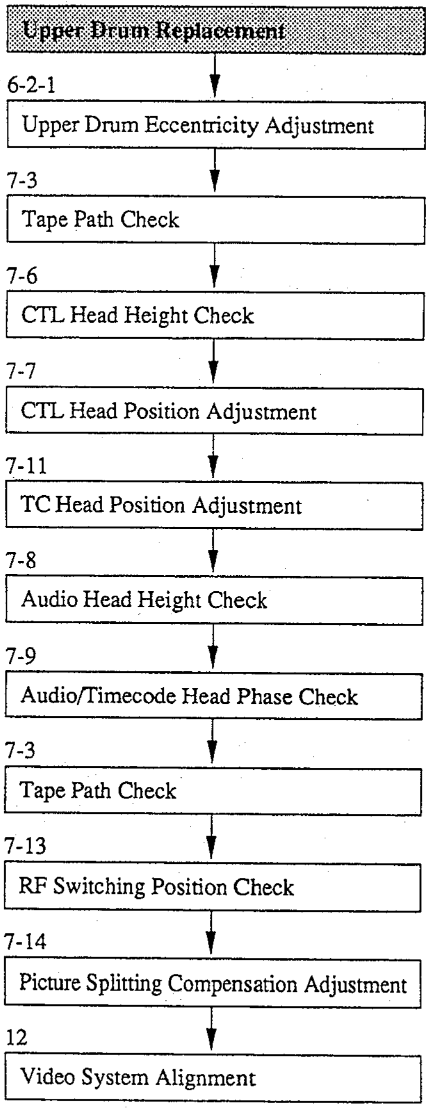
6-2. UPPER DRUM REPLACEMENT

- The Upper Drum is the periodic replacement parts. Replace it referring to the periodic replacement list.
- When the video head has worn out or is damaged, replace the Upper Drum Assembly.
- When the upper drum is removed and a shim is found on the flange, be sure to leave it on the flange. If the shim should be lost or replaced with a thicker one, video head height from the reference plane will be incorrect, resulting in loss of interchangeability.

Tools :

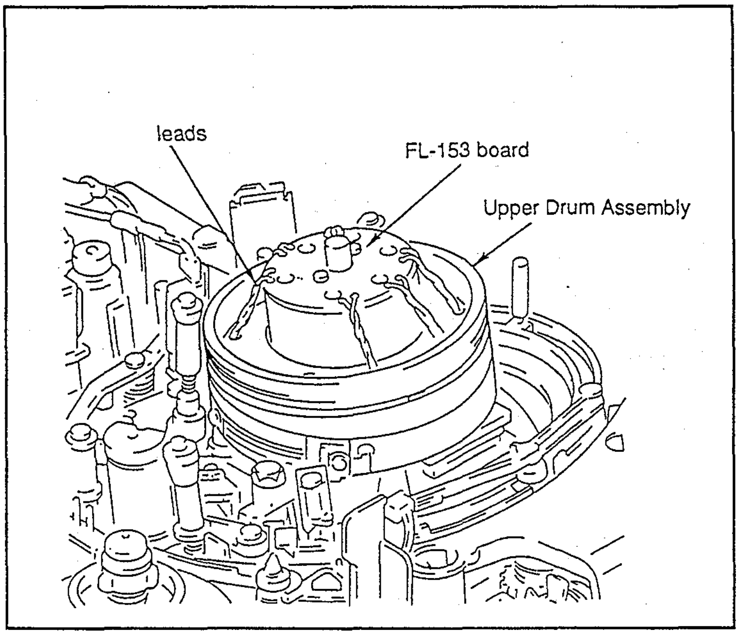
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart


Upper Drum Replacement
6-2-1
Upper Drum Eccentricity Adjustment
7-3
Tape Path Check
7-6
CTL Head Height Check
7-7
CTL Head Position Adjustment
7-11
TC Head Position Adjustment
7-8
Audio Head Height Check
7-9
Audio/Timecode Head Phase Check
7-3
Tape Path Check
7-13
RF Switching Position Check
7-14
Picture Splitting Compensation Adjustment
12
Video System Alignment

Removal

1. Unsolder the 12 leads (UVW-1700G/1700GP) or the 8 leads (UVW-1400A/1400AP) connected to the FL-153 board in the center of the drum.

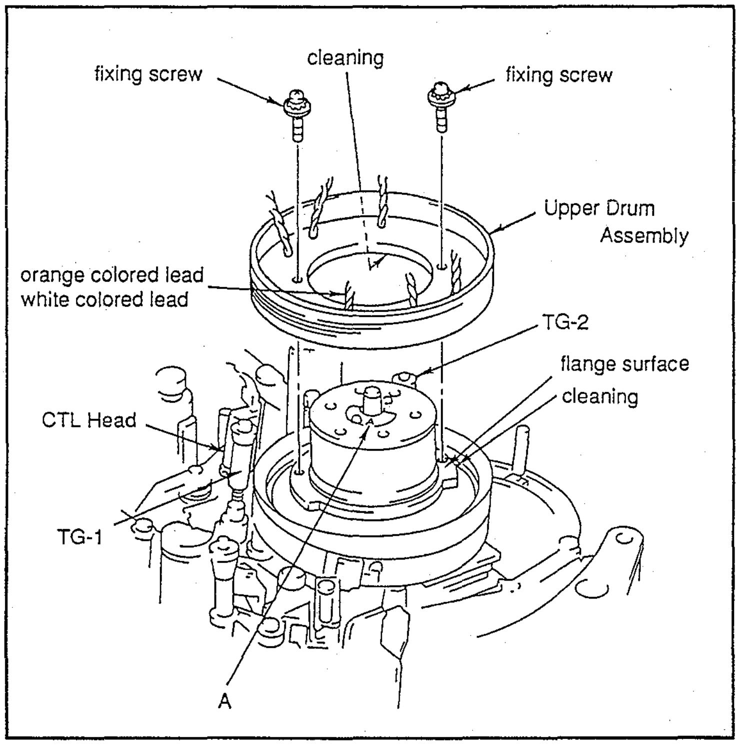

leads
FL-153 board
Upper Drum Assembly

2. Remove the two screws fixing the Upper Drum. Remove the Upper Drum upward paying utmost care not to injure the TG-1 and CTL head. The toothed washers and flat washers are also taken out at the same time.

Precaution : When removing the Upper Drum, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

Installation

3. Clean the Lower Drum flange surface and the contacting surface of the new Upper Drum with cleaning piece moistened with cleaning fluid.
4. While paying utmost care not to contact with TG-1 and CTL head, install the new Upper Drum so that the orange and white leads of the Upper Drum come close to the printed letter "A" on the FL-153 board.


fixing screw
cleaning
fixing screw
Upper Drum Assembly
orange colored lead
white colored lead
TG-2
flange surface
cleaning
CTL Head
TG-1
A

Precaution 1 : When installing the Upper Drum on the flange, pay utmost care not to injure the tape running surface of the Upper Drum or the video head.

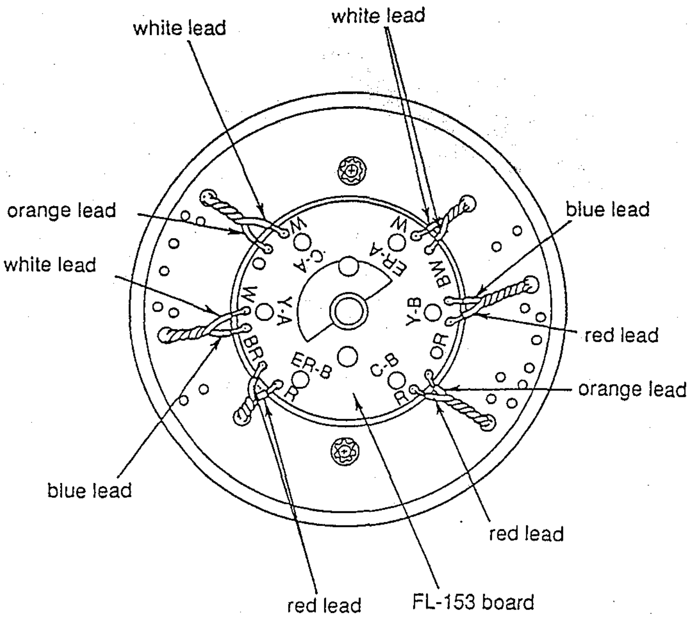
Precaution 2 : When installing the Upper Drum on the flange, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

Precaution 3 : When installing the Upper Drum, pay attention not to reverse the mounting position.

5. Solder the 12 or 8 leads of the Upper Drum to the FL-153 board.

Reference :

Markings on FL-153 board	Color of Upper Drum leads
C・A・O	orange
C・A・W	white
Y・A・W	white
Y・A・B	blue
ER-B・R	red (for UVW-1700G/ 1700GP)
ER-B・R	red (for UVW-1700G/ 1700GP)
C・B・O	orange
C・B・R	red
Y・B・R	red
Y・B・B	blue
ER-A・W	white (for UVW-1700G/ 1700GP)
ER-A・W	white (for UVW-1700G/ 1700GP)


white lead
white lead
orange lead
white lead
blue lead
red lead
orange lead
blue lead
red lead
red lead
FL-153 board
W
C-A
O
W
Y-A
W
BR
ER-B
R
ER-A
W
BW
Y-B
OR
C-B
R

Adjustment after replacement

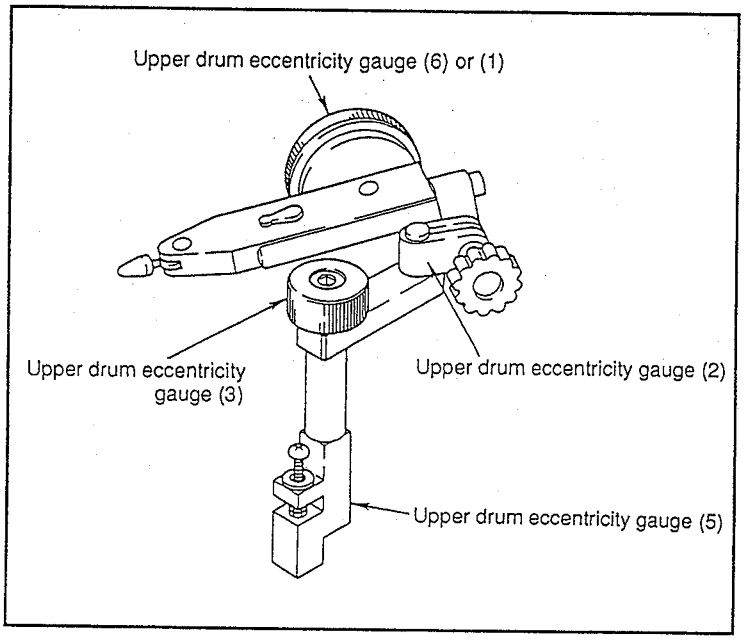
6. Perform the Upper Drum Eccentricity adjustment. (Refer to section 6-2-1.)
7. Tape Path Check. (Refer to section 7-3.)
8. Perform the CTL Head Height Check. (Refer to section 7-6.)
9. Perform the CTL Head Position Adjustment. (Refer to section 7-7.)
10. Perform the TC Head Position Adjustment. (Refer to section 7-11.)
11. Perform the Audio Head Height Check. (Refer to section 7-8.)
12. Perform the Audio/Timecode Head Phase Check. (Refer to section 7-9.)
13. Perform the Tape Path Check. (Refer to section 7-3.)
14. Perform the RF Switching Position Adjustment. (Refer to section 7-13.)
15. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
16. Perform the video system Alignment. (Refer to section 12.)

6-2-1. Upper Drum Eccentricity Adjustment

- When the Upper Drum is replaced, be sure to perform the Upper Drum eccentricity adjustment.

Tools :

Upper drum eccentricity gauge (2)	: J-6001-830-A
Upper drum eccentricity gauge (3)	: J-6001-820-A
Upper drum eccentricity gauge (5)	: J-6087-000-A
Upper drum eccentricity gauge (6)	: J-6325-530-A
or (1)	: J-6001-840-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01


Upper drum eccentricity gauge (6) or (1)
Upper drum eccentricity gauge (3)
Upper drum eccentricity gauge (2)
Upper drum eccentricity gauge (5)

Assemble the upper drum eccentricity gauges as shown.

For Reference :

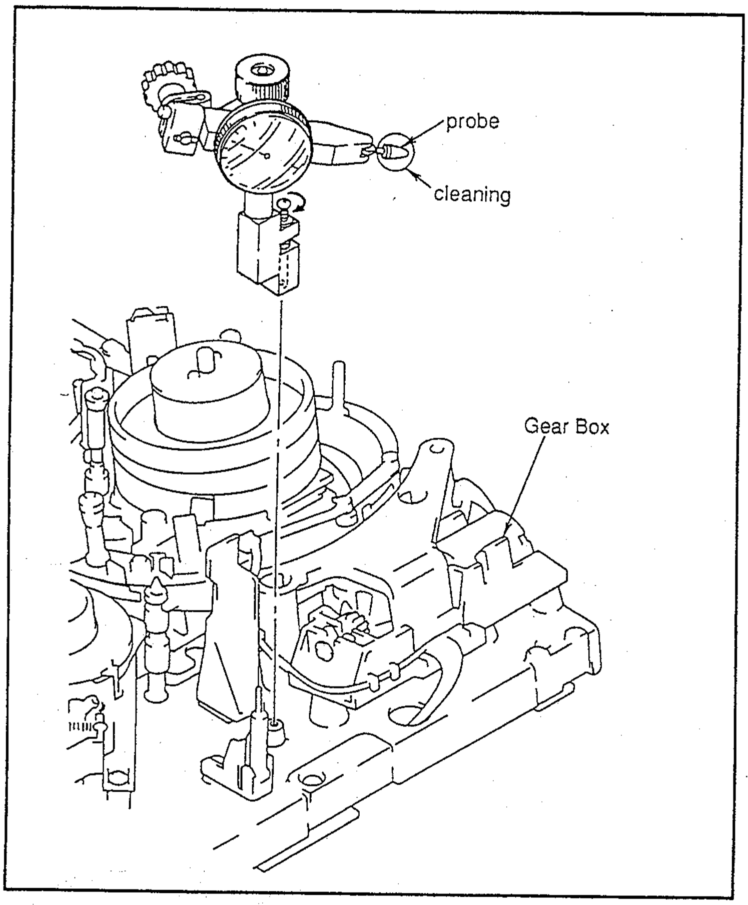
The drum eccentricity gauge (J-6080-038-A) and the dial gauge holder (J-6080-039-A) can be used instead of the upper drum eccentricity gauge (2), (3) and (5).

Adjustment procedure

1. Clean the probe of the assembled upper drum eccentricity gauge with cleaning piece soaked with cleaning fluid.

Precaution : If a probe is employed with dust attached to it, it may injure the tape contacting surface of the Upper Drum.

2. Install the assembled eccentricity gauge in the hole on the Chassis near Gear Box.


probe
cleaning
Gear Box

3. Adjust the gauge position so that its probe is positioned about 5 mm from the top edge of the Upper Drum.

Precaution : Pay attention that the probe should not contact the video head.

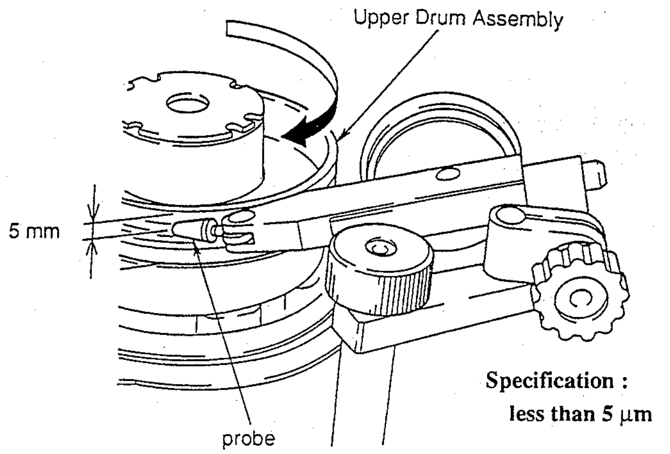
4. Rotate the Upper Drum slowly clockwise. Check that the gauge reading deflection satisfies the specification.

When the specification is satisfied, perform the step (6) and later.
If it does not satisfy the specification, perform the step (5) and later.

5. Adjustment required only when the specification is not satisfied.
   (1) Rotate the Upper Drum slowly clockwise. Check the gauge reading deflection.
   (2) Rotate the Upper Drum slowly clockwise and stop rotating at the point which gives the maximum deflection.
   (3) Push the top of the Upper Drum contacting the probe with finger for 1/2 of the deflection. If the deflection will not move, loosen the two fixing screws and then make adjustment.
   If the deflection moves too easily, tighten the screws.
   (4) Check again that the specification is satisfied.
6. Tighten the two screws alternately.
   Tightening torque : 0.8N•m (8 kgf•cm).
7. Check again that the amount of upper drum eccentricity satisfies the specification.
8. Remove the upper drum eccentricity gauge.

Precaution : Pay attention that the probe should not contact the video head.

9. Clean the video head and the tape contacting surface of the Upper Drum with cleaning piece soaked by cleaning fluid. After cleaning, wipe the cleaning surface a few times with dry cloth.



Specification :
less than 5 μm

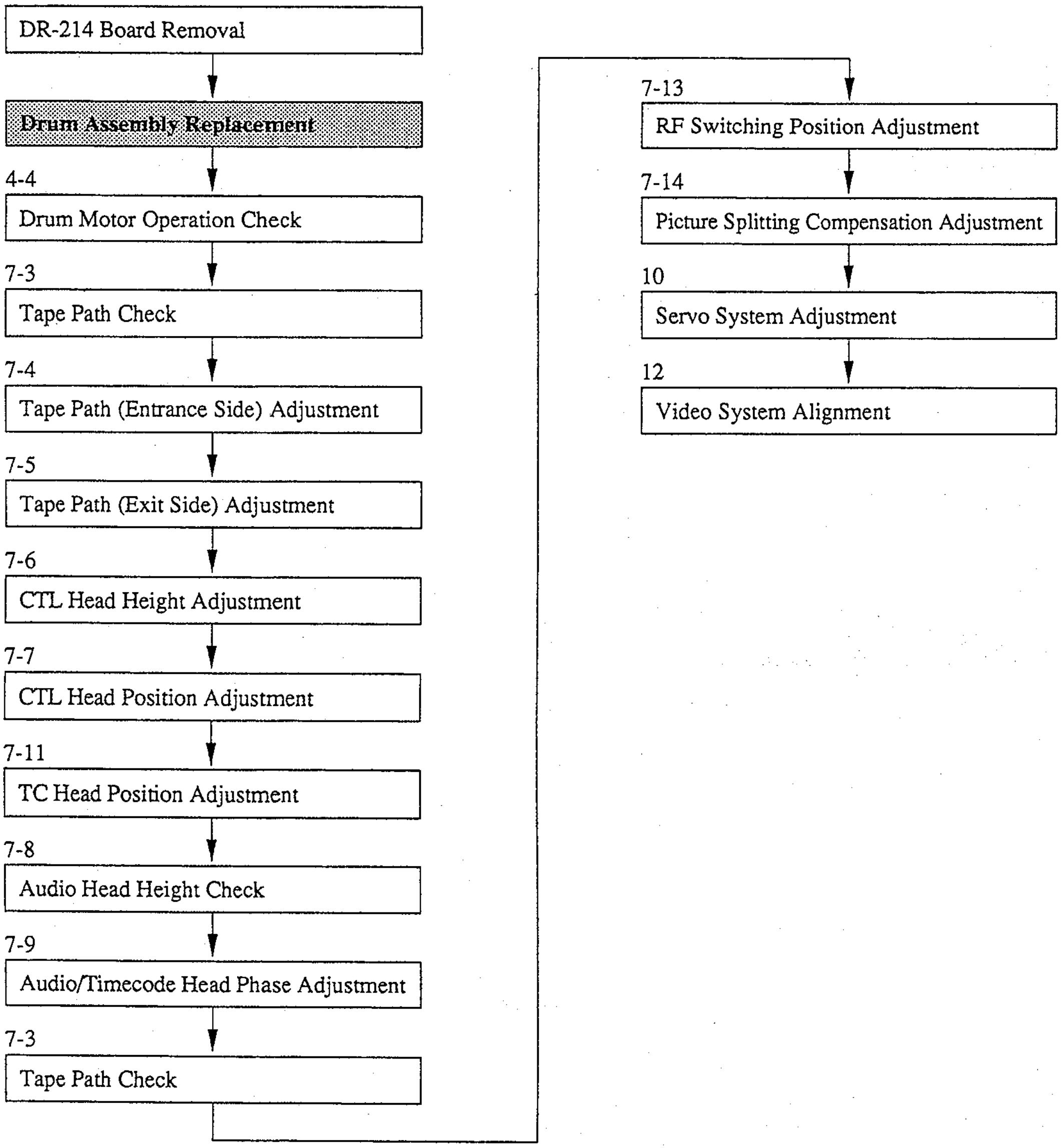
6-3. DRUM ASSEMBLY REPLACEMENT

- The Drum Assembly is the periodic replacement parts. It is recommended to replace referring to the periodic replacement table.
- Replace the Drum Assembly in the following cases.
  1. When the rabbet guide of the lower drum has worn out, and the correct RF envelope cannot be obtained by the tape path.
  2. When the rabbet guide or tape contacting surface of the lower drum is injured.
  3. When the drum rotation is abnormal and the performance as a VTR cannot be maintained due to noise or jitter.
- The Drum Assembly includes the Upper Drum Assembly. When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced at the same time.

Tools :

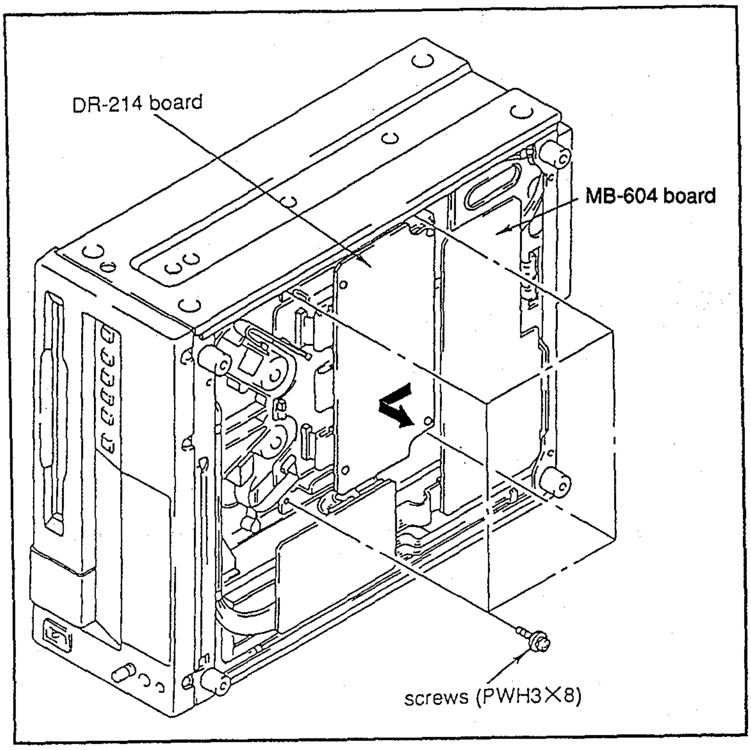
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

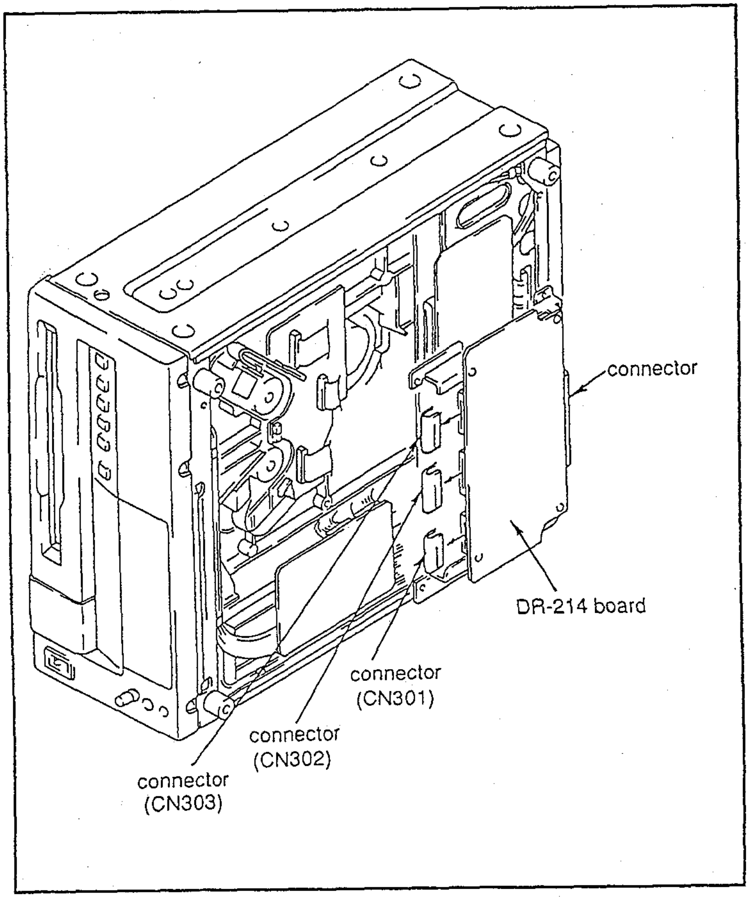
Replacement flow chart


DR-214 Board Removal
Drum Assembly Replacement
4-4
Drum Motor Operation Check
7-3
Tape Path Check
7-4
Tape Path (Entrance Side) Adjustment
7-5
Tape Path (Exit Side) Adjustment
7-6
CTL Head Height Adjustment
7-7
CTL Head Position Adjustment
7-11
TC Head Position Adjustment
7-8
Audio Head Height Check
7-9
Audio/Timecode Head Phase Adjustment
7-3
Tape Path Check
7-13
RF Switching Position Adjustment
7-14
Picture Splitting Compensation Adjustment
10
Servo System Adjustment
12
Video System Alignment

Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board brackets.
3. Unplug the connector connecting the DR-214 and MB-604 boards.
4. Remove the three flexible card wires connected to the DR-214 board. (CN301, CN302, CN303)


DR-214 board
MB-604 board
screws (PWH3X8)

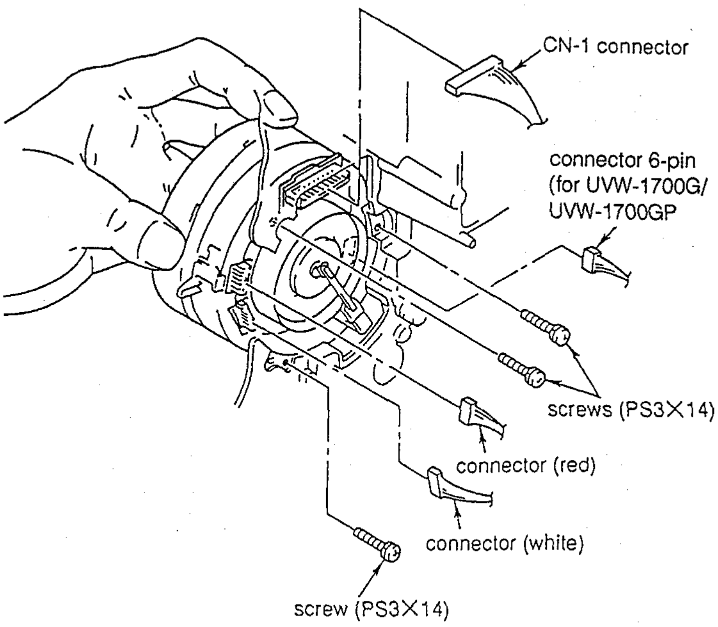

connector
DR-214 board
connector (CN301)
connector (CN302)
connector (CN303)

5. Remove the four connectors (UVW-1700G/ 1700GP) or the three connectors (UVW-1400A/ 1400AP) connected to the Drum Assembly.
6. While holding the Drum Assembly with hand from the front of the unit, remove the three screws securing the Drum Assembly from the rear of the unit.

Precaution 1 : Hold the Drum Assembly so as not to drop it.

Precaution 2 : Pay utmost attention not to injure the guides around the Drum Assembly.

7. Remove the Drum Assembly taking care so that the Drum Assembly does not contact the TG-1, TG-2, CTL head and cleaning roller.


CN-1 connector
connector 6-pin (for UVW-1700G/ UVW-1700GP
screws (PS3X14)
connector (red)
connector (white)
screw (PS3X14)

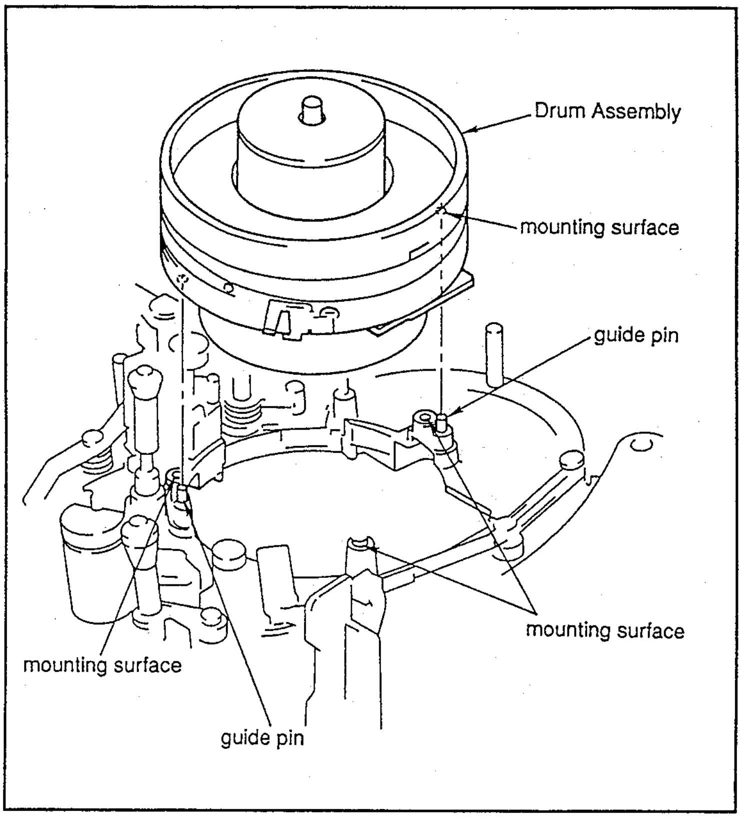
Installation

8. Clean the mounting surface of the new Drum Assembly and the drum mounting surface of the chassis with the cleaning piece soaked with cleaning fluid.
9. Insert a new Drum Assembly in the following procedure. Make sure the Drum Assembly does not come into contact with TG-1, TG-2, CTL Head and Cleaning Roller during the course of Drum Assembly installation. Align the guide holes of the new Drum Assembly to the two guide pins of the chassis. Install the new Drum Assembly to the chassis.

Precaution 1 : Pay utmost care not to injure the tape running surface of the Upper Drum, video head, tape contacting surface and rabbet guide of the lower drum.

Precaution 2 : Pay utmost care not to contact nor injure the guides and heads around the drum.

10. Secure the new Drum Assembly with three screws.
11. Insert the connectors of the four (UVW-1700G/1700GP) or three (UVW-1400A/1400AP) harnesses to the Drum Assembly having the same colors.
12. Perform the works reversing the steps 4 through 1.
13. Clean the tape contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.



Adjustment after replacement

14. Perform the Drum Motor operation check (Refer to section 4-4.)
15. Tape Path Adjustment. (Refer to section 7-3, 7-4, 7-5.)
16. Perform the CTL Head Height Check. (Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment. (Refer to section 7-7.)
18. Perform the TC Head Position Adjustment. (Refer to section 7-11.)
19. Perform the Audio Head Height Check. (Refer to section 7-8.)
20. Perform the Audio/Timecode Head Phase Check. (Refer to section 7-9.)
21. Perform the Tape Path Check. (Refer to section 7-3.)
22. Perform the RF Switching Position Check. (Refer to section 7-13.)
23. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
24. Perform the Servo System Adjustment.
25. Perform the Video System Alignment.

6-4. DRUM SHAFT GROUNDING ASSEMBLY REPLACEMENT

- When the Shaft Grounding Assembly worn out, the white scattered noise may appear on the monitor. Then replace the Shaft Grounding Assembly.
- Do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

DR-214 Board Removal

↓

Drum Shaft Grounding Assembly Replacement

Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board brackets. (Refer to section 6-3.)
3. Unplug the connector connecting the DR-214 And MB-604 boards.
4. Remove the screw fixing the Drum Shaft Grounding Assembly and remove it.

Installation

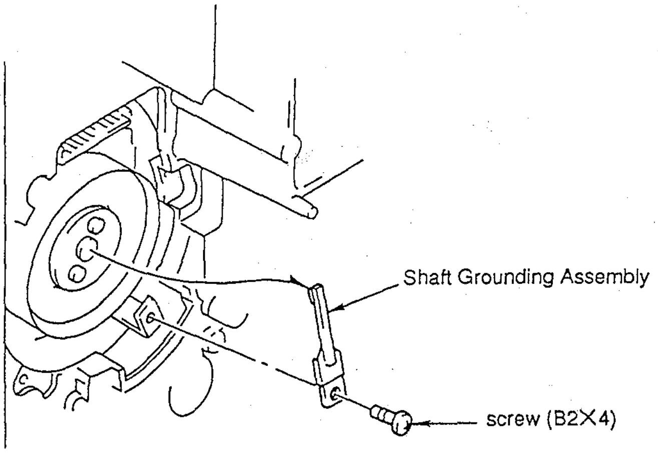
5. Clean the protruding tip at the top of new Drum Shaft Grounding Assembly with cleaning piece moistened with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.

Precaution : During cleaning, do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

6. Clean the Shaft Grounding Assembly and its contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid.
7. Install the Shaft Grounding Assembly so that the protruding tip at the top of Drum Shaft Grounding Assembly is positioned in the center of the contacting surface on the bottom of the Drum Assembly.

Precaution : During installation, do not apply force on the Shaft Grounding Assembly nor bent it forcibly.

8. Perform the works reversing the steps 3 through 1.



6-5. REEL TABLE ASSEMBLY REPLACEMENT

- The Reel Table Assembly replacement procedure is common to the take-up reel table and supply reel table.

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Allen wrench (1.5 mm diagonally)	: 7-700-736-05

Replacement flow chart

6-5-1

Reel Cover Removal

↓

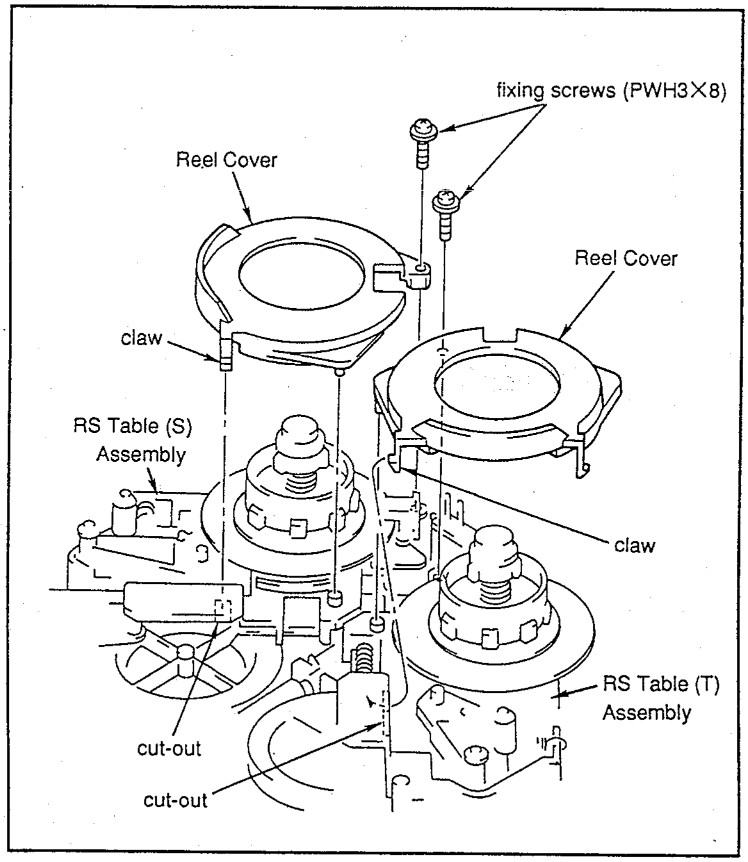
Reel Table Assembly Replacement

6-5-2 ↓

Reel Table Height Check/Adjustment

6-5-1. Reel Cover Removal

1. Remove the screw fixing the Reel Cover.
2. Unlock the Reel Cover claw from the cut-out of the RS Table (S, T) Assembly. Remove it upward.


fixing screws (PWH3X8)
Reel Cover
Reel Cover
claw
RS Table (S) Assembly
claw
RS Table (T) Assembly
cut-out
cut-out

Removal

1. As viewed the Reel Table Assembly from the top, insert a L shaped wrench from the side into the square holes (two points). Loosen the set screws (two points) of the Reel Table.

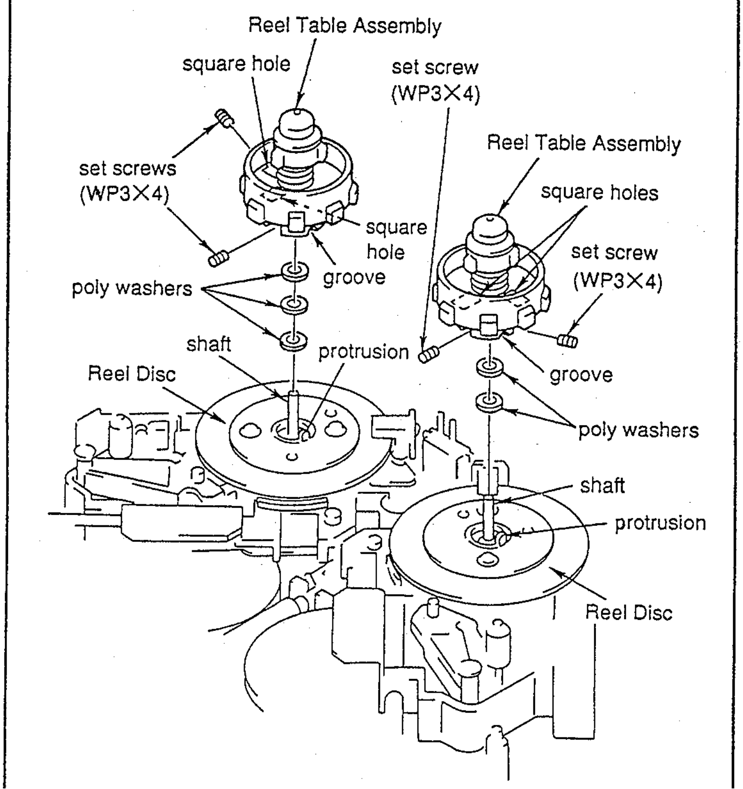
Precaution : Poly slider washers are inserted at the bottom of Reel Table bearing. This is for height adjustment of Reel Table. When removing a reel table, the poly slider washer may adhere to the bottom of the Reel Table. Take care not to lose the poly slider washers.

2. Remove the Reel Table Assembly with finger.
3. Perform the same procedure as the step 1 on the other Reel Table. Loosen the set screw and remove the Reel Table.

Installation

4. Insert a new Reel Table Assembly into the shaft to match the Reel Disc protrusion with the groove of the new Reel Table Assembly.

Precaution : Tighten the set screws of each Reel Table Assembly after reel height is confirmed.


Reel Table Assembly
square hole
set screw
(WP3X4)
Reel Table Assembly
set screws
(WP3X4)
square holes
square
hole
set screw
(WP3X4)
groove
poly washers
shaft
protrusion
Reel Disc
groove
poly washers
shaft
protrusion
Reel Disc

6-5-2. Reel Table Height Check / Adjustment

- When a Reel Motor is replaced or a Reel Table is removed or replaced, perform this item.
- For stable tape run, the supply reel table is positioned 0.25 mm higher than what is adjusted by the reel table height gauge. The take up reel table is positioned 0.13 mm higher than what is adjusted by the reel table height gauge.
- The reel table height adjustment establishes the references of tape path system. Pay utmost attention in this adjustment.

Tools :

Cassette reference plate (L)	: J-6320-880-A
Reel table height gauge	: J-6320-680-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

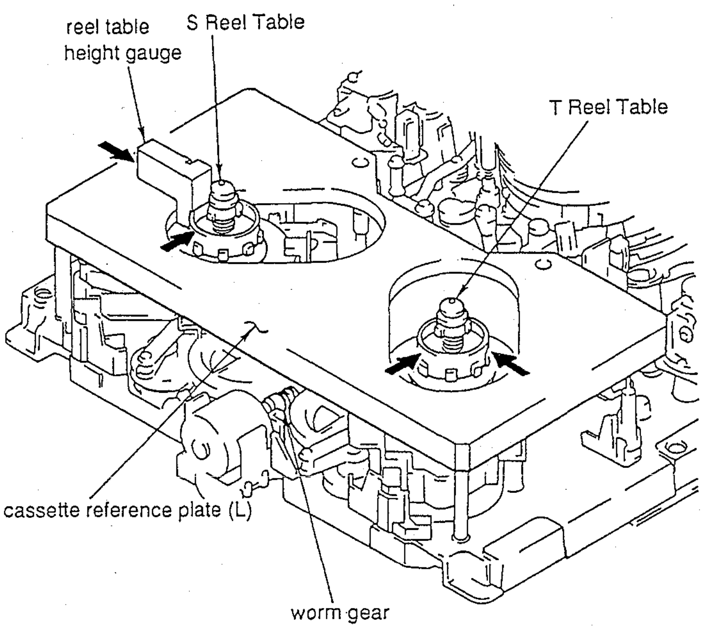
Check procedure

1. Confirm that the machine is in the unthreaded end position.
2. Rotate the worm gear with finger to set the Reel Table in the L-cassette position.
3. Clean the surface of the cassette reference plate (L) with cleaning piece moistened with cleaning fluid.
4. Place the cassette reference plate in the position where a cassette is located.
5. Clean the surface of the reel table height gauge with cleaning piece moistened with cleaning fluid.
6. Move the reel table height gauge from the two directions as shown by the arrow toward the supply or take-up reel tables to check that the specifications are satisfied.

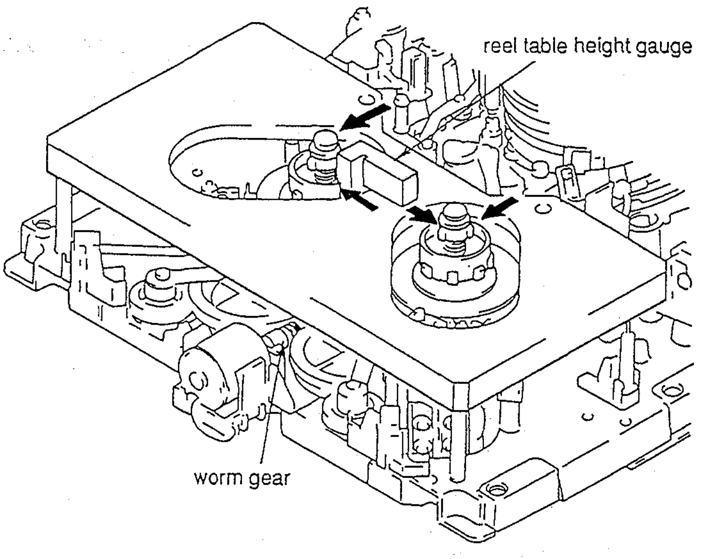
Specifications
- The * marked portion of the gauge passes the flange of the reel table.
- The * * marked portion of the gauge is blocked by the flange of the reel table.

7. Rotate the worm gear with finger to set the Reel Table in the S-cassette position.
8. Perform the step 6 again. Confirm that the specifications are satisfied.
   If any of the specification is not satisfied, perform the adjustment shown in step 9 and later until the specifications are satisfied in both L- and S-cassette positions. When the specifications in both L- and S-cassette positions are satisfied, go to step 11 and later.

<L-cassette position>

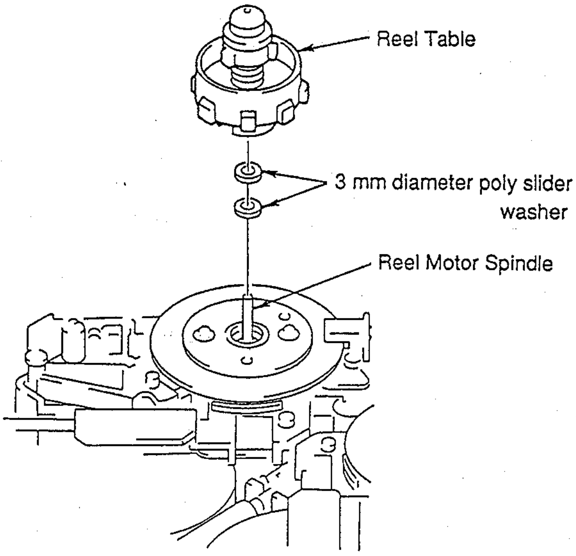


<S-cassette position>

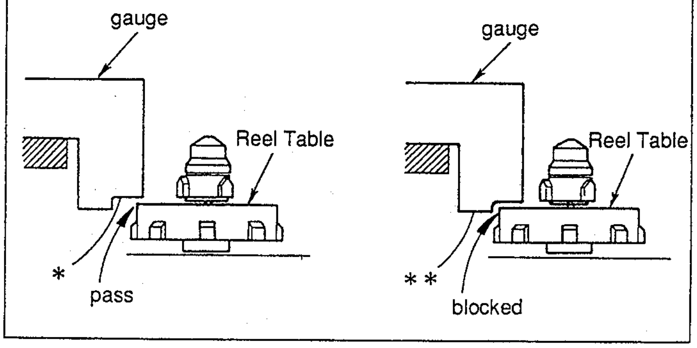


Adjustment procedure

9. Remove the Reel Table.
10. Exchange the poly slider washer inserted in the reel motor spindle. Select combination of appropriate thickness of poly slider washers until the specifications in both L- and S-cassette positions are satisfied.
    adjustment poly slider washers (3 mm diameter)
    0.13 mm thick : 3-701-439-01
    0.25 mm thick : 3-701-439-11
    0.5 mm thick : 3-701-439-21
11. After the step 10 is completed, remove the supply reel table once. Add a poly slider washer of 0.25 mm thick under the reel table.
12. After the step 10 is completed, remove the take-up reel table once. Add a poly slider washer of 0.13 mm thick under the reel table.
13. While pushing the supply and take-up reel tables downward, tighten the two reel table fixing screws with L shaped wrench.


Reel Table
3 mm diameter poly slider washer
Reel Motor Spindle

Specifications :


gauge
Reel Table
*
pass
gauge
Reel Table
* *
blocked

6-6. REEL ROTATION DETECTING ELEMENT REPLACEMENT

- The Reel Rotation Detecting Element replacement procedure is common to take-up side and supply side.

Replacement flow chart

Set the Reel Table to the L-Cassette Position
↓ 6-5-1
Reel Cover Removal
↓
Reel Rotation Detecting Element Replacement
↓
Reel FG Duty Adjustment

Removal

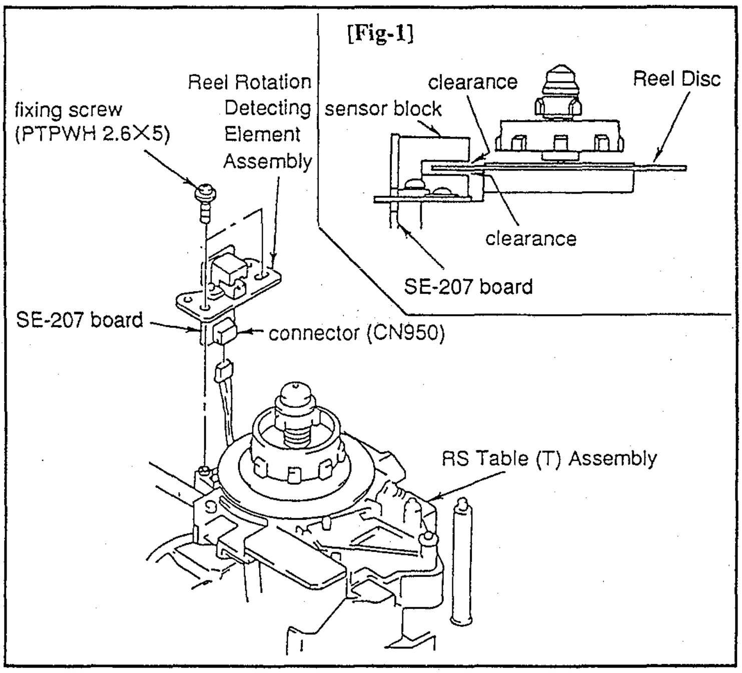
1. Set the Reel Table to the L-cassette position. (Refer to section 6-5.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the two screws fixing the Reel Rotation Detecting Element. Remove it not to collapse with the reel disc.
4. Unplug the connector (CN950) which is connected to the Reel Rotation Detecting Element.
5. Remove a screw fixing SE-207 board.
6. Remove the two fixing screws. Remove SE-207 board from the sensor mounting bracket.
7. Unsolder the photo interrupter which is soldered on the SE-207 board.

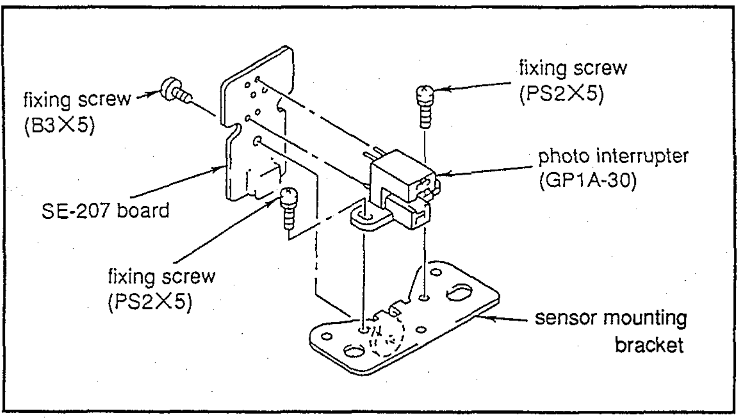
Installation

8. Connect by soldering the new photo interrupter (GP1A-30) on the SE-207 board.
9. Attach the photo interrupter to the sensor mounting bracket using two screws.
10. Attach the SE-207 board to the sensor mounting bracket using a screw.
11. Confirm that clearance exits between the sensor block and the reel disc. (Refer to Fig-1)

Adjustment after replacement

12. Reel FG Duty Adjustment. (Refer to section 4-5.)


[Fig-1]
fixing screw
(PTPWH 2.6X5)
Reel Rotation
Detecting
Element
Assembly
clearance
sensor block
Reel Disc
clearance
SE-207 board
SE-207 board
connector (CN950)
RS Table (T) Assembly


fixing screw
(B3X5)
SE-207 board
fixing screw
(PS2X5)
fixing screw
(PS2X5)
photo interrupter
(GP1A-30)
sensor mounting
bracket

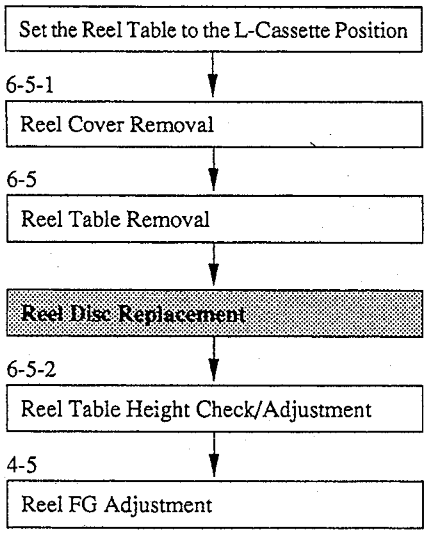
6-7. REEL DISC REPLACEMENT

- When a Reel Disc is injured or deformed, replace the reel disc.
- The Reel Disc replacement procedure is common to take-up side and supply side.

Tools :

L shaped wrench (across flat has 1.5 mm)
: 7-700-736-05
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart


Set the Reel Table to the L-Cassette Position
6-5-1
Reel Cover Removal
6-5
Reel Table Removal
Reel Disc Replacement
6-5-2
Reel Table Height Check/Adjustment
4-5
Reel FG Adjustment

Removal

1. Rotate the worm of the LS motor to set the L-Reel Table to the L-cassette position. (Refer to section 6-5.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the Reel Table. (Refer to section 6-5.)

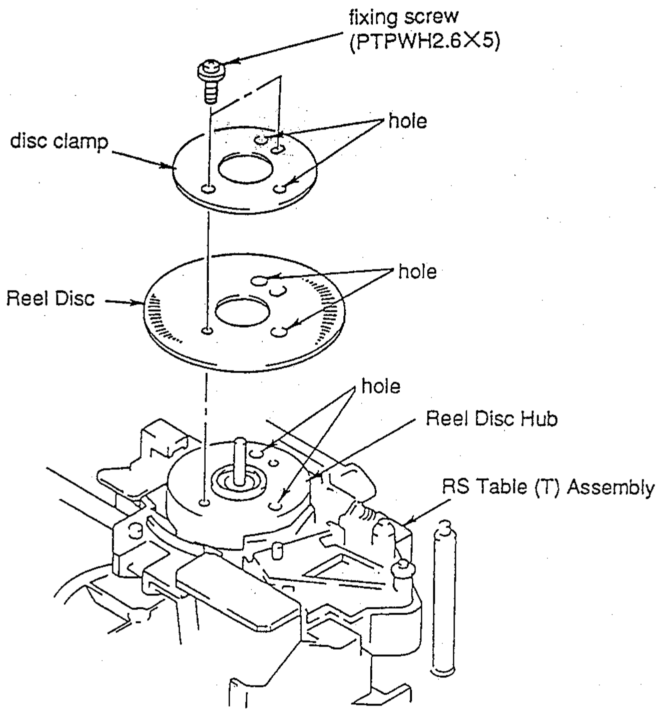
4. Remove the two screws fixing the Reel Disc. Remove the Reel Disc from the reel hub.

Installation

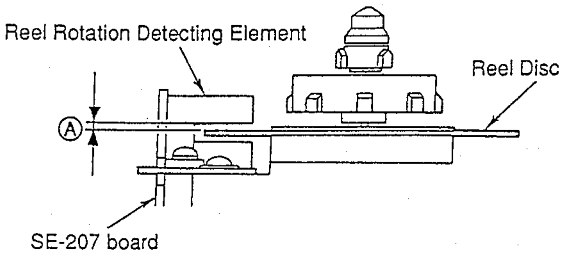
5. Install a new Reel Disc onto the reel disc hub together with the disc clamp aligning the holes. Take care not to deform the new Reel Disc during installation.
6. Clearance between the Reel Rotation Detecting Element and Reel Disc must satisfy the specifications. (Refer to Fig-1)
7. Install the Reel Table. (Refer to section 6-5.)

Adjustment after replacement

8. Check the reel height. (Refer to section 6-5.)
9. Perform the Reel FG Duty Adjustment. (Refer to section 4-5.)
10. Attach the Reel Cover. (Refer to section 6-5-1.)


fixing screw (PTPWH2.6X5)
hole
disc clamp
hole
Reel Disc
hole
Reel Disc Hub
RS Table (T) Assembly

[Fig-1] Specifications : 0.3 mm ≦ Ⓐ ≦ 0.7 mm


Reel Rotation Detecting Element
Reel Disc
Ⓐ
SE-207 board

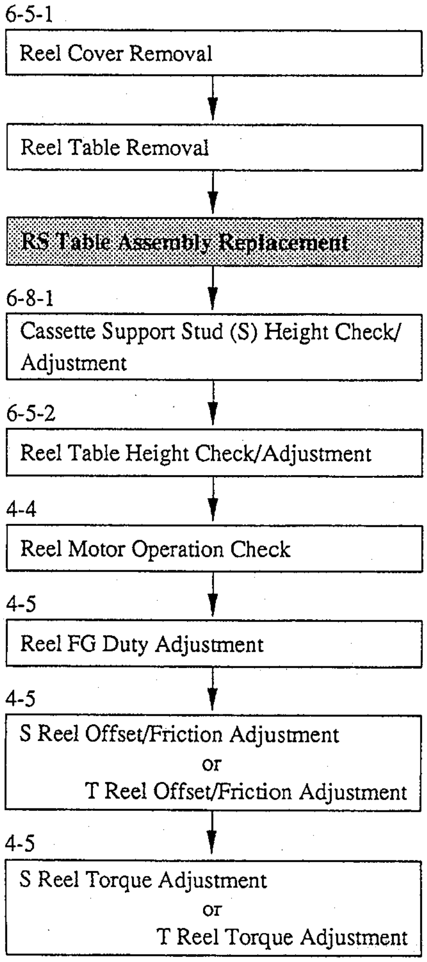
6-8. RS TABLE ASSEMBLY REPLACEMENT

- The Reel Motor Plate replacement procedure is common to take-up side and supply side.

Mode : Unthreaded end condition
Tools :

L shaped wrench (across flate has 1.5 mm)	: 7-700-736-05
Grease (SGL-505)	: 7-602-010-04
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Replacement flow chart


6-5-1
Reel Cover Removal
Reel Table Removal
RS Table Assembly Replacement
6-8-1
Cassette Support Stud (S) Height Check/Adjustment
6-5-2
Reel Table Height Check/Adjustment
4-4
Reel Motor Operation Check
4-5
Reel FG Duty Adjustment
4-5
S Reel Offset/Friction Adjustment or T Reel Offset/Friction Adjustment
4-5
S Reel Torque Adjustment or T Reel Torque Adjustment

Removal

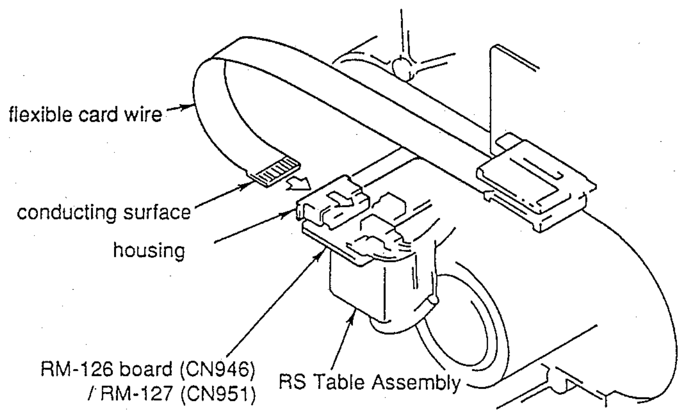
1. Stand the machine in vertical position with its side in the bottom. Remove the flexible card wire from CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.
2. Return the machine into horizontal position. Rotate the worm gear with finger as shown to move the Reel Table in between the S-cassette and L-cassette positions.
   (Rotating clockwise as viewed from front of the machine moves it toward S-cassette position. Rotating counter-clockwise move toward the L-cassette position.)
3. Remove the Reel Cover.
   (Refer to section 6-5-1.)
4. Remove the E-rings (E2.3) securing RS Table Assembly and Crank Arm Assembly.
5. Remove the screw as shown to remove the Shaft Retainer (ST).
6. Loosen the two screws securing the Shaft Retainer (S) or (T) to extract the Slide Shaft from the Shaft Retainer (S) or (T).

Precaution : Pay utmost care not to injure the Slide Shaft when extracting the Shaft.

7. Remove the RS Table Assembly and the Slide Shaft together.
8. Push the Slide Shaft in the direction of arrow to remove it from the RS Table Assembly.

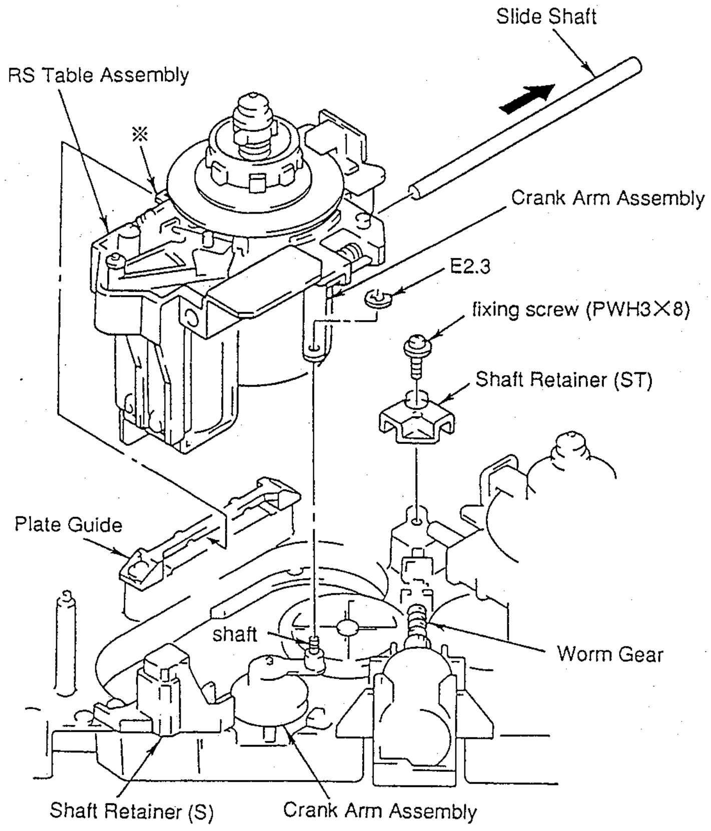
Installation

9. Clean the hole of the new RS Table Assembly where the Slide Shaft passes. Clean the area below the * marked portion. Use the cleaning piece soaked with cleaning fluid.
10. Clean the Slide Shaft with the cleaning piece soaked with cleaning fluid.


flexible card wire
conducting surface
housing
RM-126 board (CN946)
/ RM-127 (CN951)
RS Table Assembly

Removal
Hold both sides of the connector housing with fingers to pull it out. Remove the flexible card wires.

Installation
Hold both sides of the connector housing with fingers to pull it out. Insert the flexible card wires into the end. Push the housing with finger to lock it.

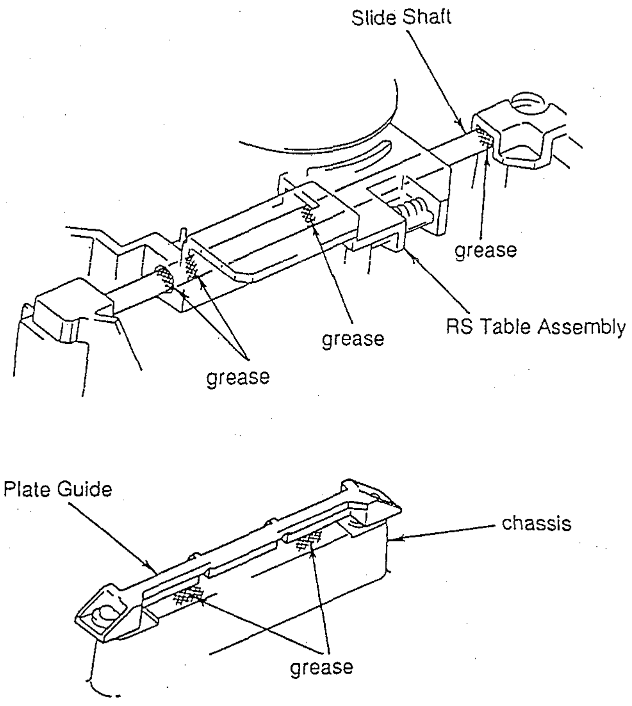

Slide Shaft
RS Table Assembly
※
Crank Arm Assembly
E2.3
fixing screw (PWH3×8)
Shaft Retainer (ST)
Plate Guide
shaft
Worm Gear
Shaft Retainer (S)
Crank Arm Assembly

11. Insert the Slide Shaft into the hole of the RS Table Assembly.
12. Insert the * marked portion of the RS Table between the Plate Guide and chassis. Insert the Slide Shaft between the Shaft Retainer (S) or (T).
13. Fix the opposite end of the Slide Shaft using the Shaft Retainer (ST) and fixing screw. The Slide Shaft is now fixed.
14. Tighten the two screws fixing the Shaft Retainer (S) or (T).
15. Move the RS Table Assembly with finger to the right and left. Check that it moves freely.
16. Fix the arm of the RS Table Assembly onto the Crank Arm Assembly using E-ring.
17. Apply grease on the Slide Shaft and chassis. (Fig-1)
18. Stand the machine in vertical position with the side in the bottom. Insert the flexible card wire to CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.

Adjustment after replacement

19. Perform the Cassette Support Stud (S) Height Check/Adjustment (Refer to section 6-8-1.)
20. Perform the Reel Table Height Check/Adjustment (Refer to section 6-5-2.)
21. Install the Reel Cover. (Refer to section 6-5-1.)
22. Check the Reel Motor operation. (Refer to section 4-4.)
23. Perform the Reel FG Duty Adjustment. (Refer to section 4-5.)
24. Perform the S Reel Offset/Friction Adjustment or T Reel Offset Friction Adjustment (Refer to section 4-5.)
25. Perform the S Reel Torque/T Reel Torque Adjustment (Refer to section 4-5.)

[Fig-1]



6-8-1. Cassette Support Stud (S) Height Check/Adjustment

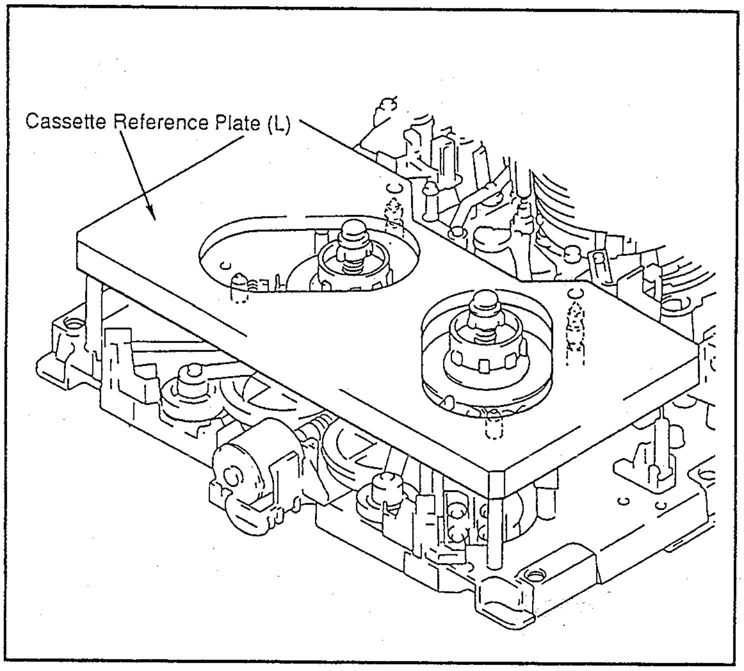
- This item is usually not necessary. When the RS Table Assembly is replaced, be sure to perform this item.

Tools :

Cassette reference plate (L)	: J-6320-880-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Adjustment mirror	: J-6080-029-A
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

Check procedure

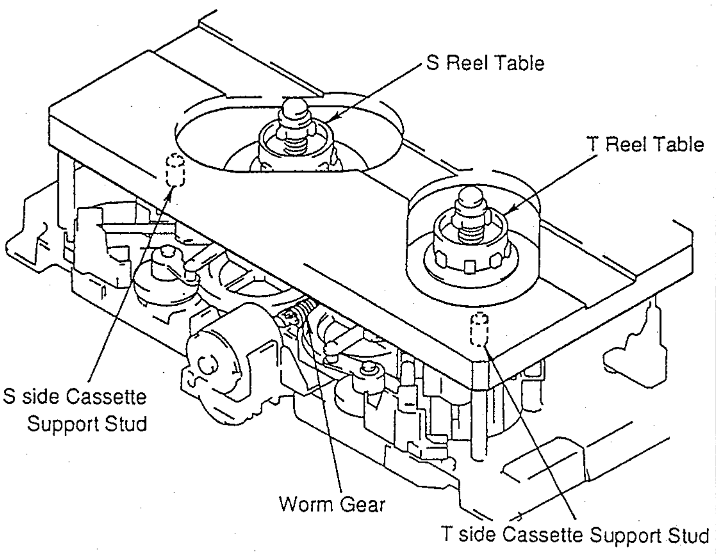
1. Confirm that the machine is in the unthreaded end position.
2. Clean the surface of the cassette reference plate with cleaning piece soaked with cleaning fluid.
3. Plate the cassette reference plate (L) in the position where cassette is positioned.

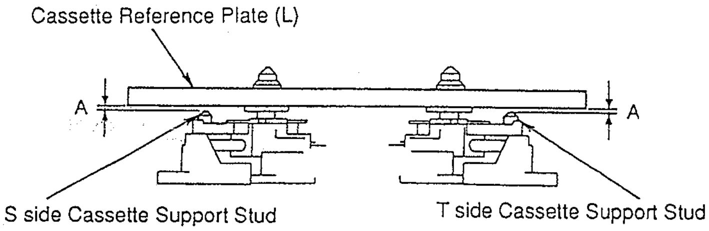


4. Rotate the worm gear with finger so that the Reel Table is positioned in the middle between the S-cassette position and L-cassette position.
   (Rotating clockwise as viewed from the front of the machine moves the Reel Table toward the S-cassette position. Rotating counter-clockwise moves toward the L-cassette position.)
   Confirm that the S side Cassette Support Stud and the T side Cassette Support Stud are located under the Cassette Reference Plate (L). (The S side Cassette Support Stud and the T side Cassette Support Stud must not be visible from the top of the machine.)
5. Turn the Cassette Reference Plate (L) upside down and place it in the position where cassette is place.
6. Confirm that there is no clearance between the Cassette Reference Plate (L) and S side Cassette Support Stud, and also between the Cassette Reference Plate (L) and the T side Cassette Support Stud, using Adjustment mirror.
   If the specification is not satisfied, perform the following step 7 and later.

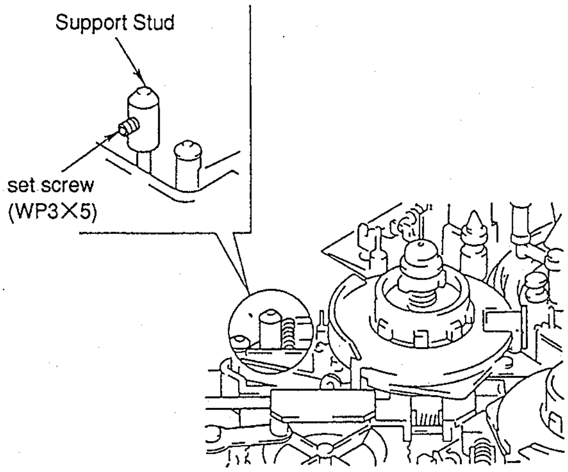
Adjustment procedure

7. Loose the screws fixing the T side Cassette Support Stud/T side Cassette Support Stud, by 1/2 to 1 turn using L shaped wrench.
8. Lift up the S side Cassette Support Stud and the T side Cassette Support Stud to contact with the Cassette Reference Plate (L). Tighten the screw with L shaped wrench.
9. Check that the specification is satisfied.


S Reel Table
T Reel Table
S side Cassette Support Stud
Worm Gear
T side Cassette Support Stud


Cassette Reference Plate (L)
A
A
S side Cassette Support Stud
T side Cassette Support Stud

Specification : A = no clearance


Support Stud
set screw
(WP3X5)

6-9. REEL MOTOR REPLACEMENT

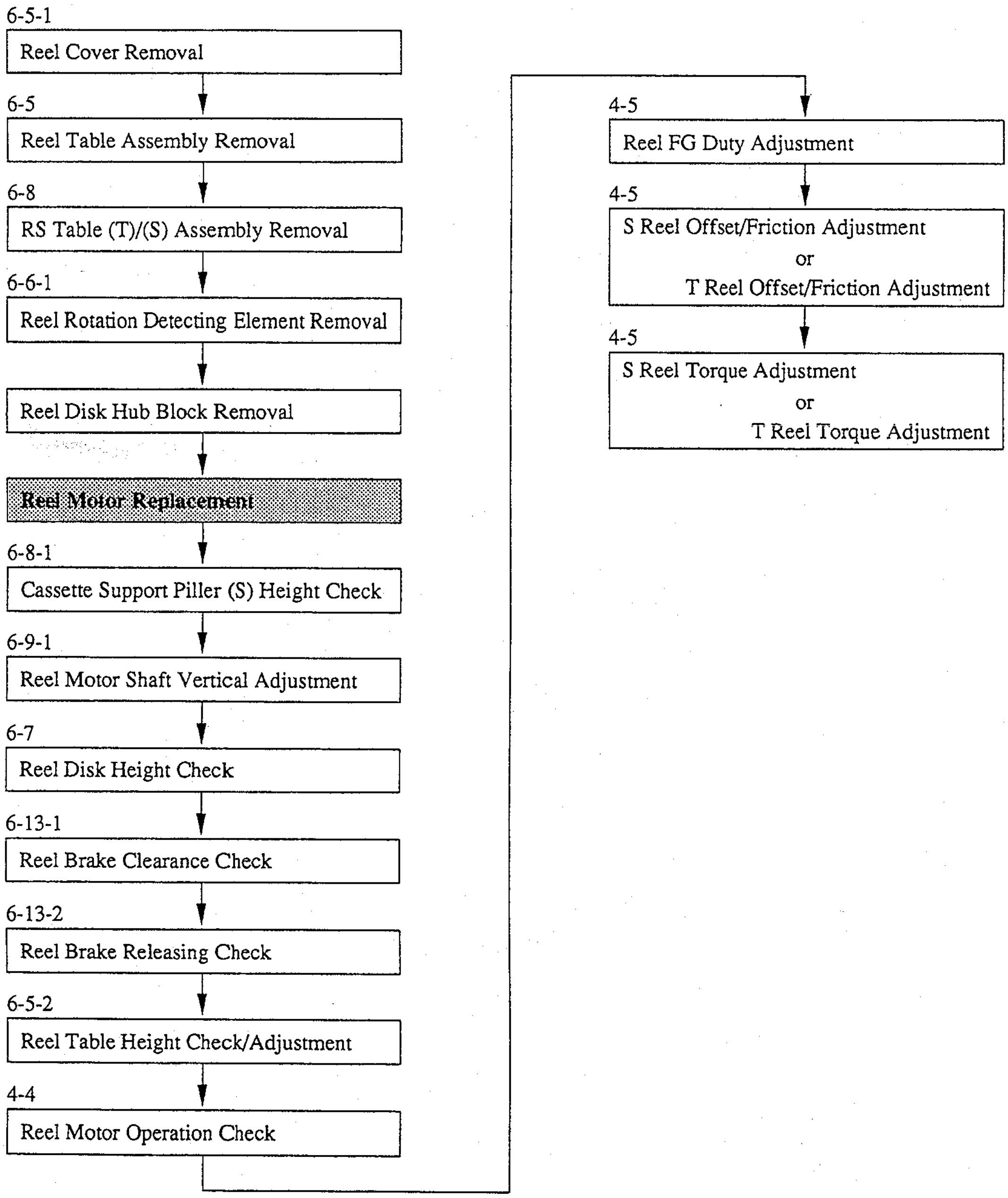
- Replace the Reel Motors on the T side and S side in the same procedure.

Mode : Unthreading end mode

Tools :

L shaped wrench (across flat has 1.5 mm) : 7-700-736-05
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

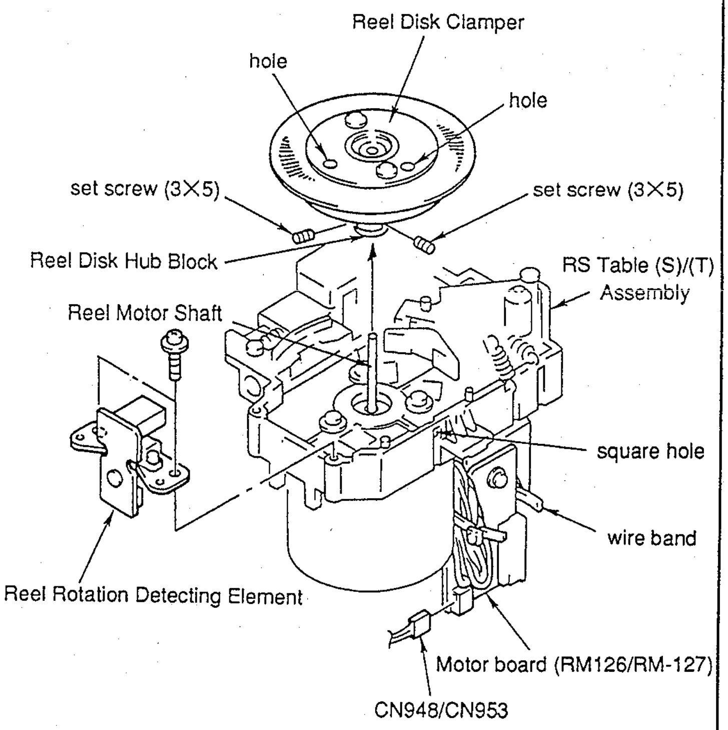
Replacement flow chart


6-5-1
Reel Cover Removal
6-5
Reel Table Assembly Removal
6-8
RS Table (T)/(S) Assembly Removal
6-6-1
Reel Rotation Detecting Element Removal
Reel Disk Hub Block Removal
Reel Motor Replacement
6-8-1
Cassette Support Piller (S) Height Check
6-9-1
Reel Motor Shaft Vertical Adjustment
6-7
Reel Disk Height Check
6-13-1
Reel Brake Clearance Check
6-13-2
Reel Brake Releasing Check
6-5-2
Reel Table Height Check/Adjustment
4-4
Reel Motor Operation Check
4-5
Reel FG Duty Adjustment
4-5
S Reel Offset/Friction Adjustment
or
T Reel Offset/Friction Adjustment
4-5
S Reel Torque Adjustment
or
T Reel Torque Adjustment

Removal

1. Rotate the Worm Gear of the LS Motor manually so that the RS Table Assembly (T)/(S) is centered between the L and S cassette positions.
   (When the gear is turned clockwise as viewed from the front of the unit, the RS Table (T)/(S) Assembly is moved to the S cassette position, and when the gear is turned counterclockwise, the RS Table (T)/(S) Assembly is moved to the L cassette position.)
2. Remove the Reel Cover.
   (Refer to section 6-5-1.)
3. Remove the Reel Table.
   (Refer to section 6-5.)
4. Remove the RS Table (T)/(S) Assembly.
   (Refer to section 6-8.)
5. Remove the Reel Rotation Detecting Element.
   (Refer to section 6-6-1.)
6. Using the holes (two points) of the Reel Disk Clamp as a guide, put the L shaped wrench into the square hole of the RS Table (T)/(S) Assembly to turn the two set screws on the Reel Disk Hub Block a 1/2 or 1 rotation and remove the Reel Disk Hub Block from the motor shaft.
7. Cut the wire band.
8. Disconnect the RM-126 (CN948 for RS Table (S) Assembly) or RM-127 (CN953 for RS Table (T) Assembly) connector from the motor board.

<Side S>


Reel Disk Clamper
hole
hole
set screw (3X5)
set screw (3X5)
Reel Disk Hub Block
RS Table (S)/(T) Assembly
Reel Motor Shaft
square hole
wire band
Reel Rotation Detecting Element
Motor board (RM126/RM-127)
CN948/CN953

9. Remove the three set screws from the Reel Motor Plate Assembly and remove the Reel Motor.

Precaution :

Do not lose the Reel Motor Shaft Vertical Adjustment Spacers when removing the Reel Motor.

When attaching the motor again, restore the same number of Spacers to the same positions, and perform the Reel Motor Sahft Vertical Adjustment. There are two kinds of Spacers which have different thickness.

Installation

10. Clean the surfaces of the new Reel Motor and Reel Motor Plate Assembly with the cleaning piece moistened with the cleaning fluid.
11. Install the Reel Motor to the Reel Motor Plate Assembly in the direction as illustrated in the figure with three screws.

Precaution :

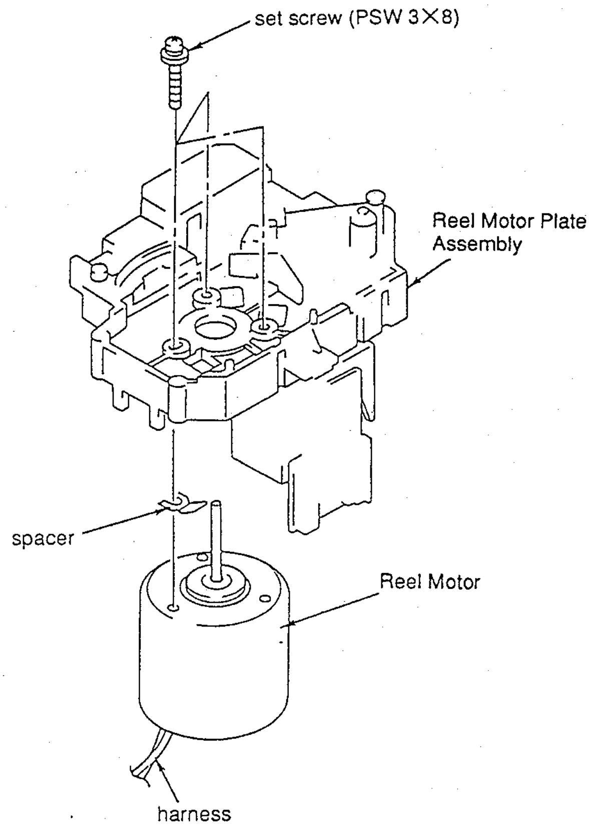
- Restore the spacers as they were.
- Tighten the three screws with the same torque.

12. Connect the connector of the Reel Motor Harness to RM-126 (CN948) or RM-127 (CN953).
13. Fasten the Reel Motor harness with another harnesses using the wire band.
14. Install the RS Table (T)/(S) Assembly. (Refer to section 6-8.)

Adjustment after Replacement

15. Check the Cassette Support Piller (S) Height. (Refer to 6-8-1.)
16. Perform the Reel Motor Shaft Vertical Adjustment. (Refer to 6-9-1.)

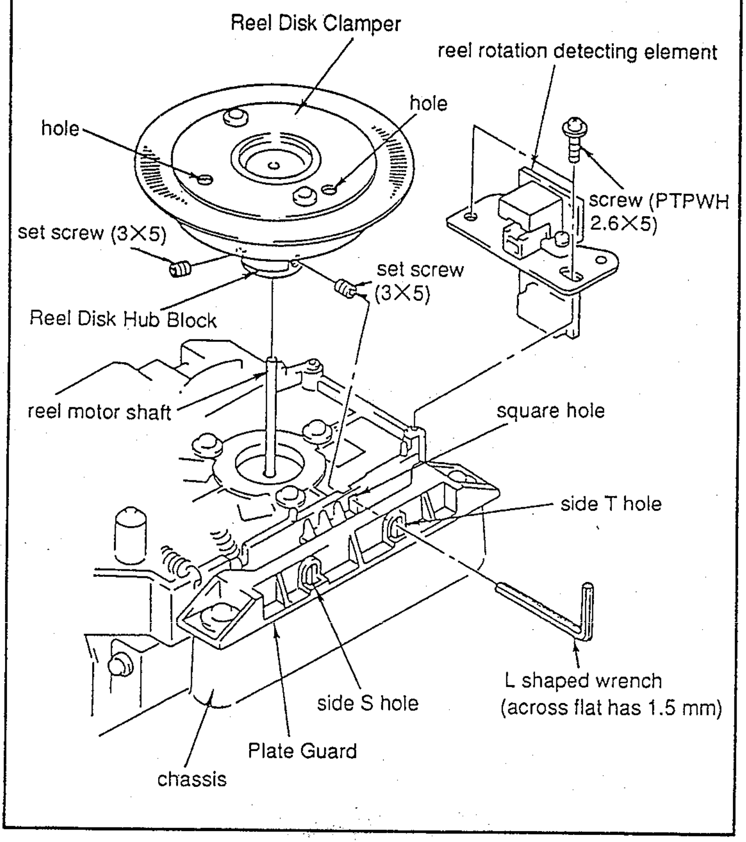
<Side S>



Installation

17. Install the Reel Disk Hub Block to the Reel Motor Saft, and align the direction of the hole of the Reel Disk Clamp to the square hole of the RS table (T)/(S) Assembly.
18. Install the Reel Rotation Detecting Element. (Refer to section 6-6-1.)
19. Insert the L shaped wrench from the side S hole for the RS Table (S) Assembly and from the side T hole for the RS Table (T) Assembly.
20. Adjust the Reel Disk height. (Refer to section 6-7.)
21. Check the Reel Brake clearance. (Refer to section 6-13-1.)
22. Check the Reel Brake Releasing. (Refer to section 6-13-2.)
23. Install the Reel Table. (Refer to section 6-5.)
24. Check the Reel Table height. (Refer to section 6-5-2.)
25. Check the Reel Motor operation. (Refer to section 4-4.)
26. Adjust the Reel FG Duty. (Refer to section 4-5.)
27. Adjust the S Reel Offset/Friction or T Reel Offset/Friction. (Refer to section 4-5.)
28. Adjust the S Reel Torque or T Reel Torque. (Refer to section 4-5.)

<Side T>


Reel Disk Clamper
reel rotation detecting element
hole
hole
screw (PTPWH 2.6X5)
set screw (3X5)
set screw (3X5)
Reel Disk Hub Block
reel motor shaft
square hole
side T hole
L shaped wrench (across flat has 1.5 mm)
side S hole
Plate Guard
chassis

6-9-1. Reel Motor Shaft Vertical Adjustment

- The procedure of the Reel Motor Shaft vertical adjustments of side S and side T are the same.
- Perform this Reel Motor Shaft vertical adjustment whenever the Reel Motor is replaced.
- If this adjustment is not performed properly, the reel hub touches the case in the cassette tape and the noise occurs or the tape may be damaged because the tape is not passed properly.

Mode : Unthreading end mode

Tools :

Cassette reference plate (L) : J-6320-880-A
Reel motor shaft slantness check jig : J-6150-960-A
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Wire clearance check gauge : J-6152-450-A

Adjustment Procedure

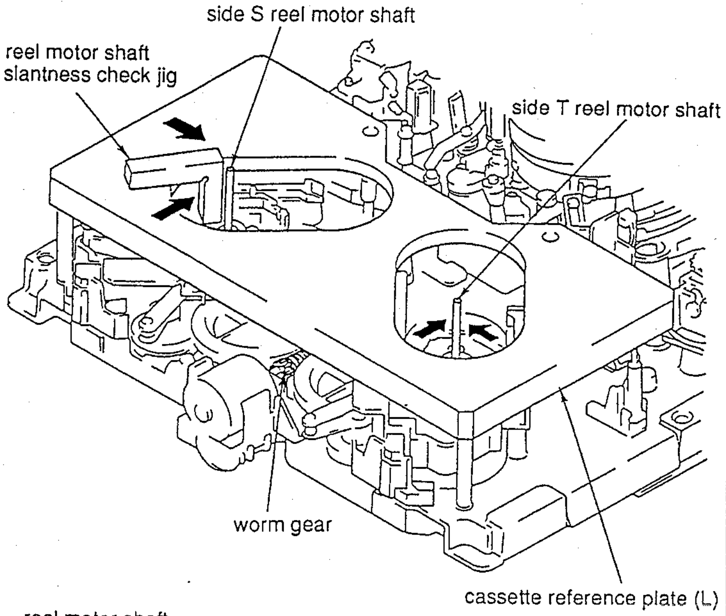
1. Rotate the Worm Gear manually to locate the Reel Motor axis to the L cassette position.
2. Put the cassette reference plate (L) to where the cassette is located.
3. Put the reel motor shaft slantness check jig to the side S or side T Reel Motor Shaft from the directions of the two arrows in the figure, and check that the clearance between the Reel Motor Axis and adjustment tool satisfies specification A or B.
4. If the specification is not satisfied, rotate the screw fixing the Reel Motor one or two rotations to loosen. Adjust the number of the spacers in the place where the Reel Motor is attached to satisfy the specification.
5. Bent a spacer as illustrated in the figure. Pick the spacer up with the tweezers, and insert the spacer between the chassis and motor through the square hole of the Reel Motor Plate Assembly.

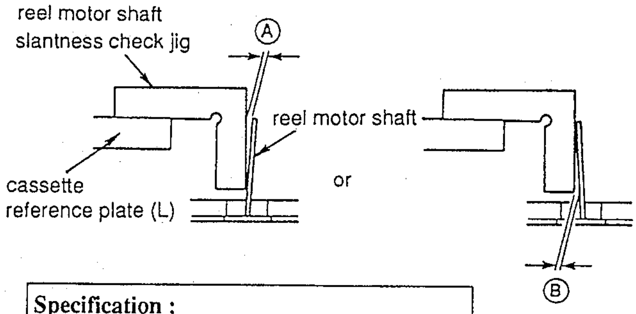
Spacer

3-182-285-01 Thickness : 0.02 mm
3-182-285-11 Thickness : 0.05 mm

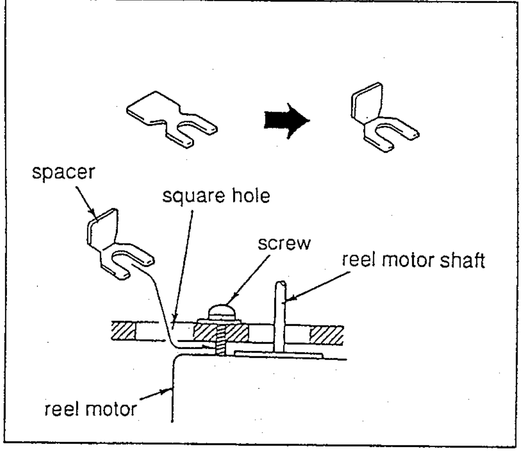
6. Tighten the three screws fixing the Reel Motor with the same torque.

<L cassette position>


side S reel motor shaft
reel motor shaft slantness check jig
side T reel motor shaft
worm gear
cassette reference plate (L)


reel motor shaft slantness check jig
Ⓐ
reel motor shaft
cassette reference plate (L)
or
Ⓑ

Specification :
L cassette position Ⓐ or Ⓑ ≦ 0.03 mm


spacer
square hole
screw
reel motor shaft
reel motor

6-10. REEL POSITION MOTOR REPLACEMENT

Tool :

L shaped wrench (across flat has 1.5 mm) : 7-700-736-01

Replacement flow chart

3-6

Front Panel Removal

↓

Reel Position Motor Replacement

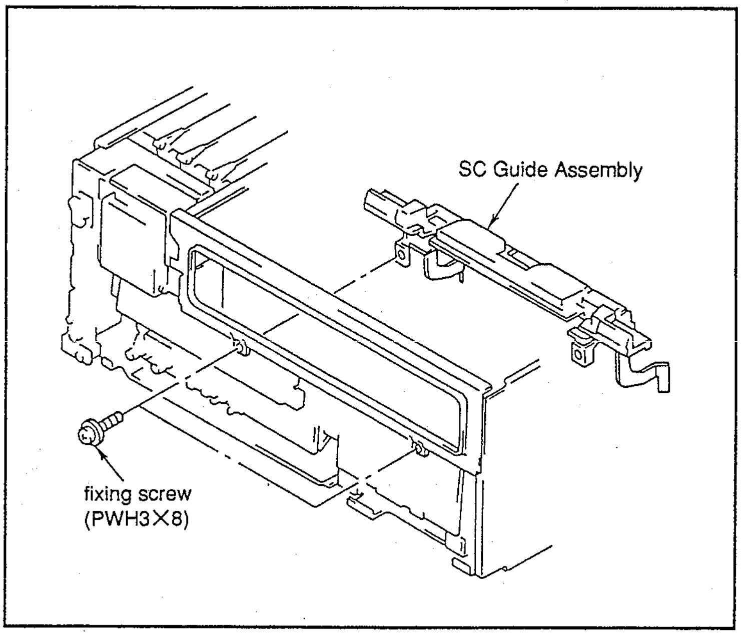
↓

4-4

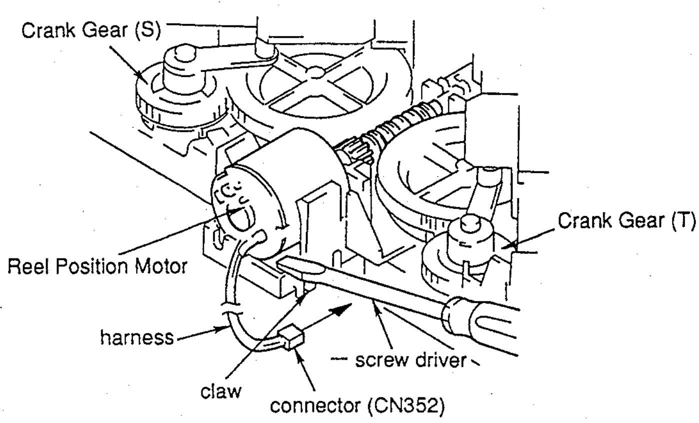
Reel Position Motor Operation Check

Removal

1. Remove the Front Panel. (Refer to section 3-6.)
2. Remove the two screws fixing the SC Guide Assembly.


SC Guide Assembly
fixing screw
(PWH3X8)

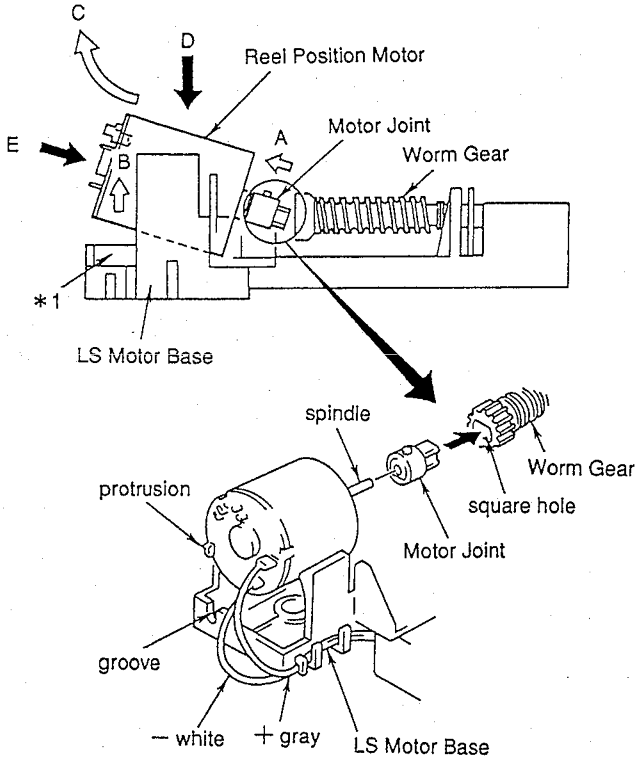
3. Cut the tie band clamping the harnesses of CN351 and CN352 of the MS-39 board from the rear of the unit and remove CN352 from MS-39 board.
4. Release the motor harness from the two claws of the base.
5. Loosen the set screw (2.6×3) fixing the motor joint 1/4 to 1/2 turn.


Crank Gear (S)
Crank Gear (T)
Reel Position Motor
harness
— screw driver
claw
connector (CN352)

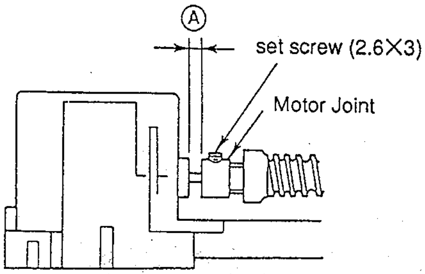
6. While pushing the motor joint fully in the direction **A**, insert a flat (–) head screw driver tip in the ∗1 marked portion to raise in the direction **B**.
7. Extract the Reel Position Motor in the direction of arrow **C**.
8. Unsolder the harness connected to the reel position motor.

Installation

9. Connect the harness to a new Reel Position Motor by soldering.
10. Insert a motor joint into the Reel Position Motor spindle. Hold them with hand and slant them. Align the motor protrusion with the groove of the LS Motor Base. Push them in from the direction of arrow **D**.
11. Align the motor joint with the square hole of the Worm Gear. Push in the Reel Position Motor from the direction of arrow **E**.
12. Fix the motor joint with set screw at the position satisfying the specification as shown.
13. Rotate the motor joint with finger and check that it rotates light.
14. Hook the harness on the two claws on the base.
15. Connect the CN352 to MS-39 board on the rear of the unit. Tie the harness with the CN352 harness.


C
D
Reel Position Motor
E
B
A
Motor Joint
Worm Gear
∗1
LS Motor Base
spindle
Worm Gear
protrusion
square hole
Motor Joint
groove
— white
+ gray
LS Motor Base

Specification : Ⓐ = 2 ± 0.1 mm


Ⓐ
set screw (2.6×3)
Motor Joint

Adjustment after replacement

16. Perform the Reel Position Motor Operation Check. (Refer to section 4-4.)

6-11. WORM GEAR REPLACEMENT (REEL POSITION MOTOR)

Mode : Unthread end mode

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-622-010-04
Sony oil (NT-68)	: 7-661-018-18

Replacement flow chart

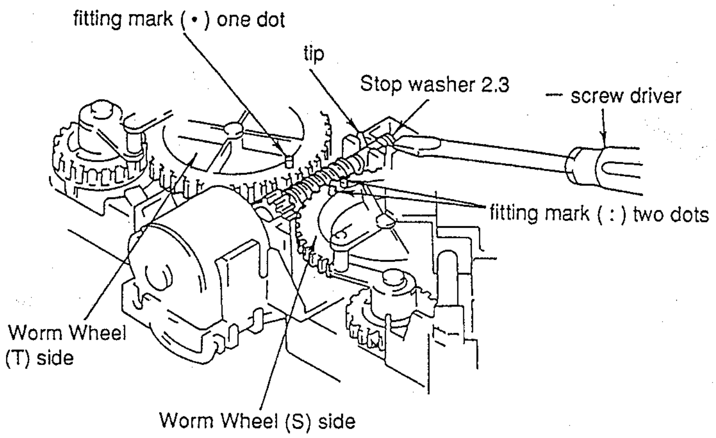
Worm Gear Replacement

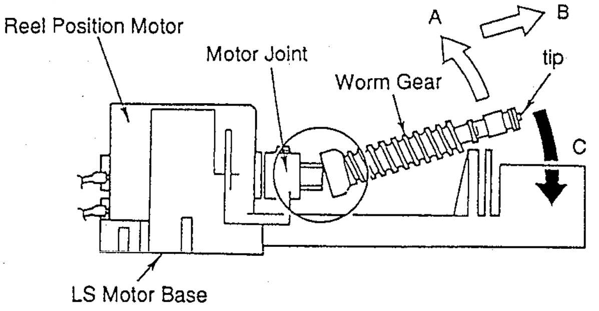
Removal

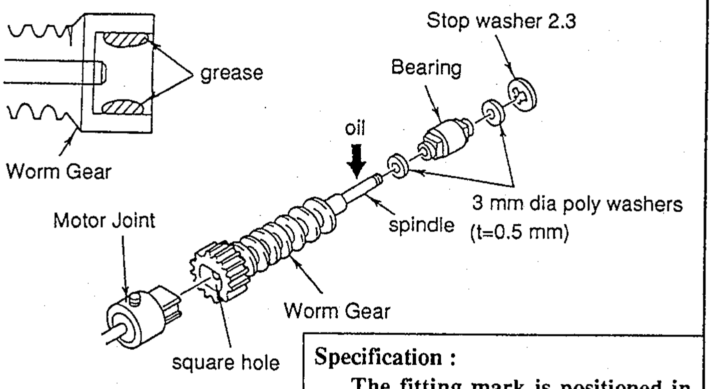
1. Slant a flat (–) head screw driver and insert it into the tip of the Worm Gear as shown. Raise the Worm Gear in the direction of arrow A.
2. Extract the Worm Gear in the direction of arrow B.
3. Remove the Stop washer 2.3 from the Worm Gear. Remove 3 mm dia poly washer (t=0.5 mm) and bearing.

Installation

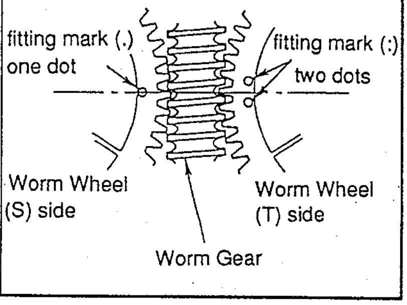
4. Clean shaft of a new Worm Gear with a cleaning piece moistened with cleaning fluid.
5. Apply a drop of Sony oil between the Worm Gear bearings as shown. Coat Sony grease thin on the square hole of the Worm Gear.
6. Rotate the Worm Wheel with finger until the fitting mark on the supply side Worm Wheel and that on the take-up side are facing each other.
7. Slant the Worm Gear so that the motor joint fits the square hole of the Worm Gear.
8. Push in the tip of the Worm Gear with finger in the direction of arrow C until it locks.
9. Check that the fitting marks on the supply side Worm Wheel and that on the take-up side satisfy the specification.


fitting mark (•) one dot
tip
Stop washer 2.3
– screw driver
fitting mark (:) two dots
Worm Wheel
(T) side
Worm Wheel (S) side


Reel Position Motor
Motor Joint
A
B
Worm Gear
tip
C
LS Motor Base


grease
Worm Gear
Stop washer 2.3
Bearing
oil
3 mm dia poly washers
(t=0.5 mm)
spindle
Motor Joint
Worm Gear
square hole

Specification :
The fitting mark is positioned in the center. The fitting marks are facing each other.


fitting mark (.)
one dot
fitting mark (:)
two dots
Worm Wheel
(S) side
Worm Wheel
(T) side
Worm Gear

6-12. REEL POSITION DETECTOR ELEMENT REPLACEMENT

Replacement flow chart

Reel Position Detector Element Replacement

↓ 4-4

Reel Position Motor Operation Check

Removal

1. Remove the screw securing the board (PTC-66) on which reel position detector element is mounted from the rear of the unit.
2. Remove the harness coming from PTC-66 board from the connector (CN944).
3. Unsolder the detector element to remove it from the PTC-66 board.

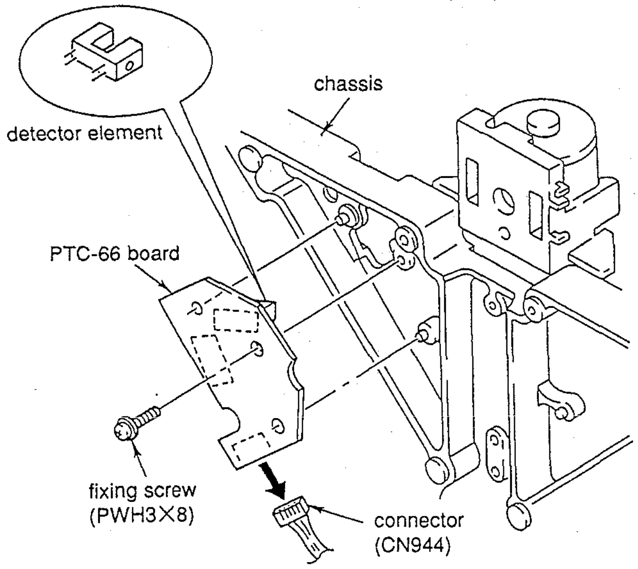
Installation

4. Solder a new reel position detector element fitting with the polarity printed on the PTC-66 board.
5. Insert the harness into the connector (CN944) on the PTC-66 board.
   Install the PTC-66 board to the chassis.

Adjustment after replacement

6. Perform the Reel Position Motor Operation Check. (Refer to section 4-4.)

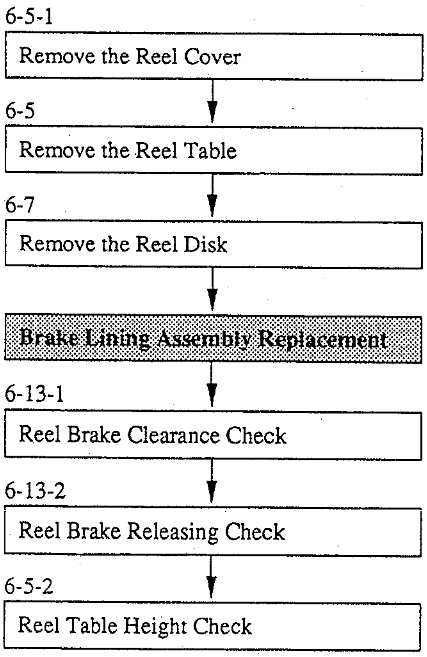
<Rear side>



6-13. BRAKE LINING ASSEMBLY REPLACEMENT

- When power is turned ON or OFF, the T reel brake lining and S reel brake lining are pressed against the T and S reel tables.
- When a cassette is inserted with the power switch turned ON, the T and S brake linings are detached from the reels. Only the Supply reel brake lining is pressed against the S reel table during threading, unthreading mode and while threading ring is rotating.
- Both the T and S reel brake linings are kept detached in the PLAY, STOP, REW, F.FWD, SEARCH and REV modes.
- When EJECT button is pressed, the EJECT mode is started. In a few seconds after EJECT mode is completed, the T and S reel brake linings are pressed against the reel tables.

Replacement flow chart


6-5-1
Remove the Reel Cover
6-5
Remove the Reel Table
6-7
Remove the Reel Disk
Brake Lining Assembly Replacement
6-13-1
Reel Brake Clearance Check
6-13-2
Reel Brake Releasing Check
6-5-2
Reel Table Height Check

Removal

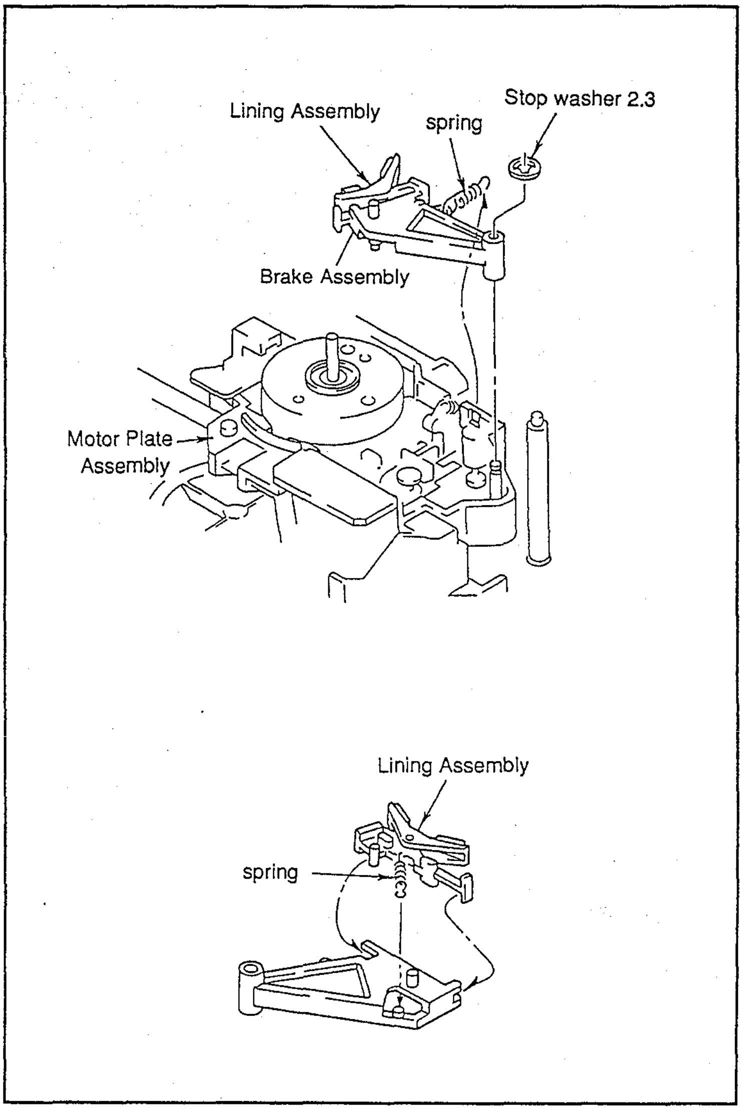
1. Remove the Reel Cover. (Refer to section 6-5-1.)
2. Remove the Reel Table. (Refer to section 6-5.)
3. Remove the Reel Disk. (Refer to section 6-7.)
4. Remove the spring of the Brake Assembly from the Motor Plate Assembly as shown.
5. Remove the Stop washer 2.3 fixing the Brake Assembly. Remove the Brake Assembly.
6. Remove the spring of the Lining Assembly from the Brake Assembly.

Installation

7. Install a new Brake Lining Assembly by reversing the steps 5 and 6.

Adjustment after replacement

8. Perform the Reel Brake Clearance Check. (Refer to section 6-13-1.)
9. Perform the Reel Brake Releasing Check. (Refer to section 6-13-2.)
10. Perform the Reel Table Installation. (Refer to section 6-5.)
11. Perform the Reel Table Height Check (Refer to section 6-5-2.)

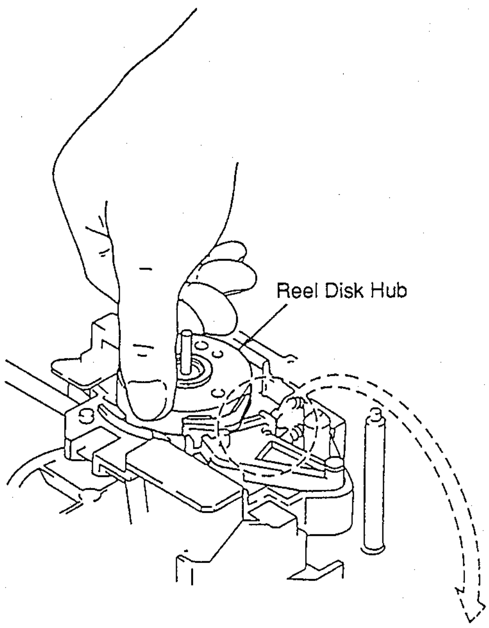

Lining Assembly
spring
Stop washer 2.3
Brake Assembly
Motor Plate Assembly
Lining Assembly
spring

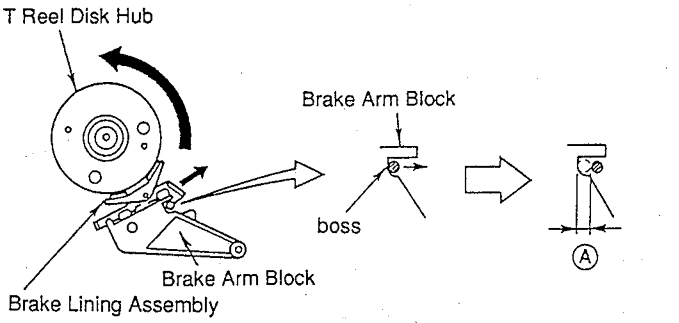
6-13-1. Reel Brake Clearance Check

- When Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Clearance Check.

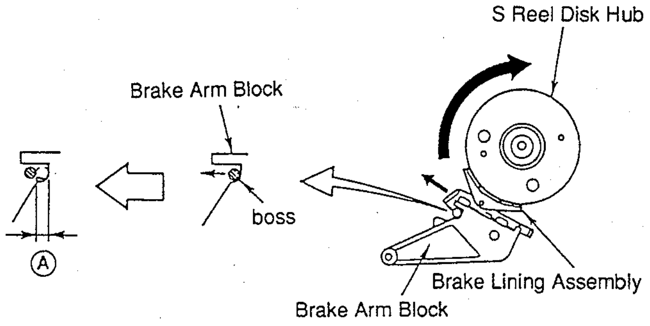
Check procedure

1. Hold the takeup reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated counter-clockwise.
   If there is no clearance replace the new Brake lining Assembly.
2. Hold the supply reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated clockwise.
   If there is no clearance replace the new Brake lining Assembly.


Reel Disk Hub


T Reel Disk Hub
Brake Arm Block
boss
Ⓐ
Brake Arm Block
Brake Lining Assembly

Specification : Ⓐ = There should be clearance.


S Reel Disk Hub
Brake Arm Block
boss
Ⓐ
Brake Lining Assembly
Brake Arm Block

Specification : Ⓐ = There should be clearance.

6-13-2. Reel Brake Releasing Check

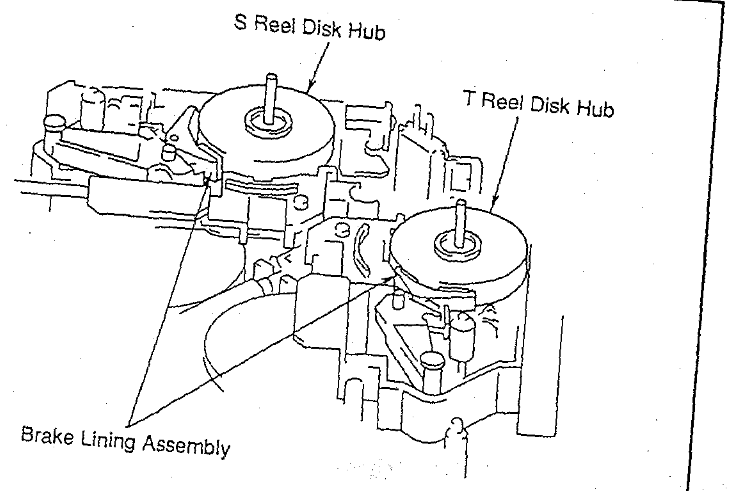
- When a Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Releasing Check.
- When a Brake Solenoid Black is replaced or adjusted, be sure to perform the Reel Brake Releasing Check.

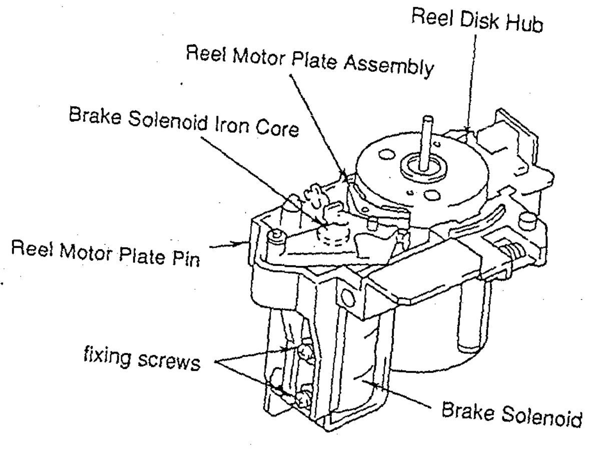
Check procedure

1. Turn off the power.
2. Check that the Brake Lining Assembly is not contacting with the take-up reel table when take-up reel is rotating.

   If this specification is not satisfied, check the Brake Assembly and Brake Solenoid Block.
3. Check that the Brake Lining Assembly is not contacting with the supply reel table when supply reel is rotating.

   If this specification is not satisfied, replace the Brake Assembly and Brake Solenoid Block.


S Reel Disk Hub
T Reel Disk Hub
Brake Lining Assembly


Reel Disk Hub
Reel Motor Plate Assembly
Brake Solenoid Iron Core
Reel Motor Plate Pin
fixing screws
Brake Solenoid

6-14. BRAKE SOLENOID REPLACEMENT

- The Brake Solenoid replacement procedure is common to take-up side and supply side.

Replacement flow chart

6-8
RS Table Assembly Removal
↓
Brake Solenoid Replacement
↓
6-13-1
Reel Brake Clearance Check
↓
6-13-2
Reel Brake Releasing Check

Removal

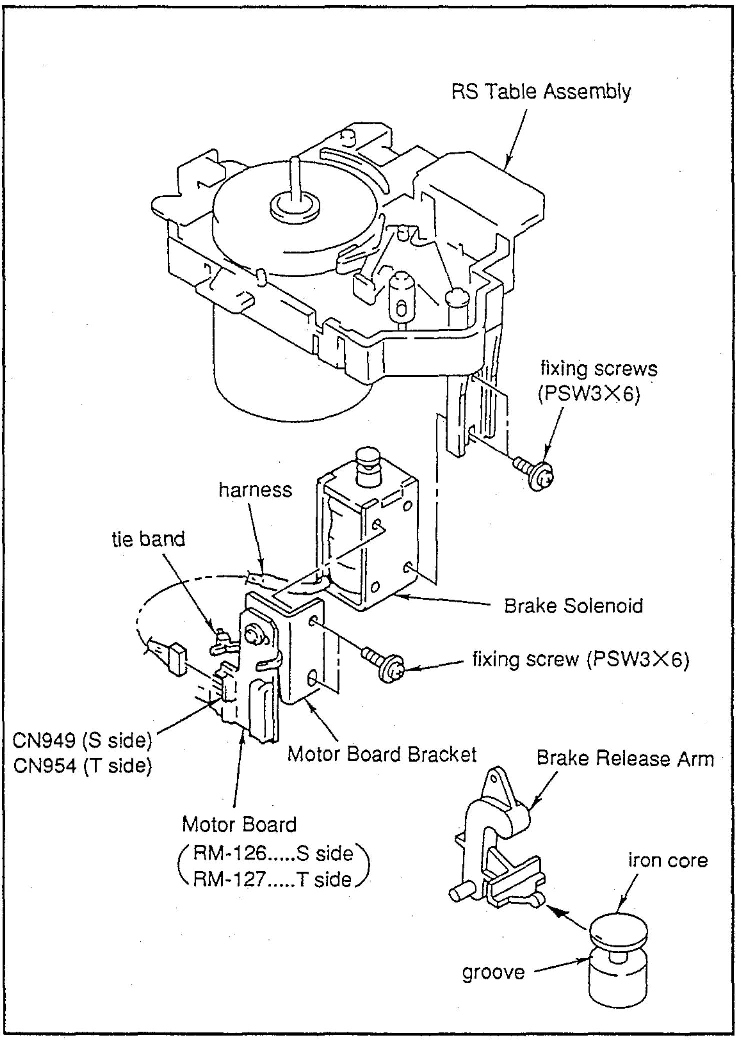
1. Remove the RS Table from the unit following the "RS Table Assembly Replacement". (Refer to section 6-8.)
2. Cut the tie band holding the Motor Board RM-126 (S side) or RM-127 (T side).
3. Unplug the harness coming from the Brake Solenoid from the Motor Board connector CN949 (S side) or CN945 (T side).
4. Remove the two screws from the Motor Board bracket. Remove the Motor Board.
5. Remove the two screws fixing the Brake Solenoid from the RS Table Assembly. Remove the Brake Solenoid.

Installation

6. Insert the groove of the new Brake Solenoid's iron core to the Brake Relase Arm. Secure it with the two fixing screws.
7. Reverse the steps 4 through 1 of the removal for installation.

Adjustment after replacement

8. Perform the Reel Brake Clearance check. (Refer to section 6-13-1.)
9. Perform the Reel Brake Releasing check. (Refer to section 6-13-2.)


RS Table Assembly
fixing screws
(PSW3X6)
harness
tie band
Brake Solenoid
fixing screw (PSW3X6)
CN949 (S side)
CN954 (T side)
Motor Board Bracket
Brake Release Arm
Motor Board
(RM-126.....S side
RM-127.....T side)
iron core
groove

6-15. PINCH ROLLER ARM ASSEMBLY REPLACEMENT

- When the Pinch Roller has worn out or is damaged, replace it as the Pinch Roller Arm Assembly.
- The Pinch Roller is the periodic replacement parts. It is recommended to use the periodic inspection table.

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Replacement flow chart

P Guide Removal

↓

Pinch Roller Arm Assembly Replacement

↓ 6-17-1

Pinch Press Assembly Position Check

↓ 7-3

Tape Path Check

↓ 7-8

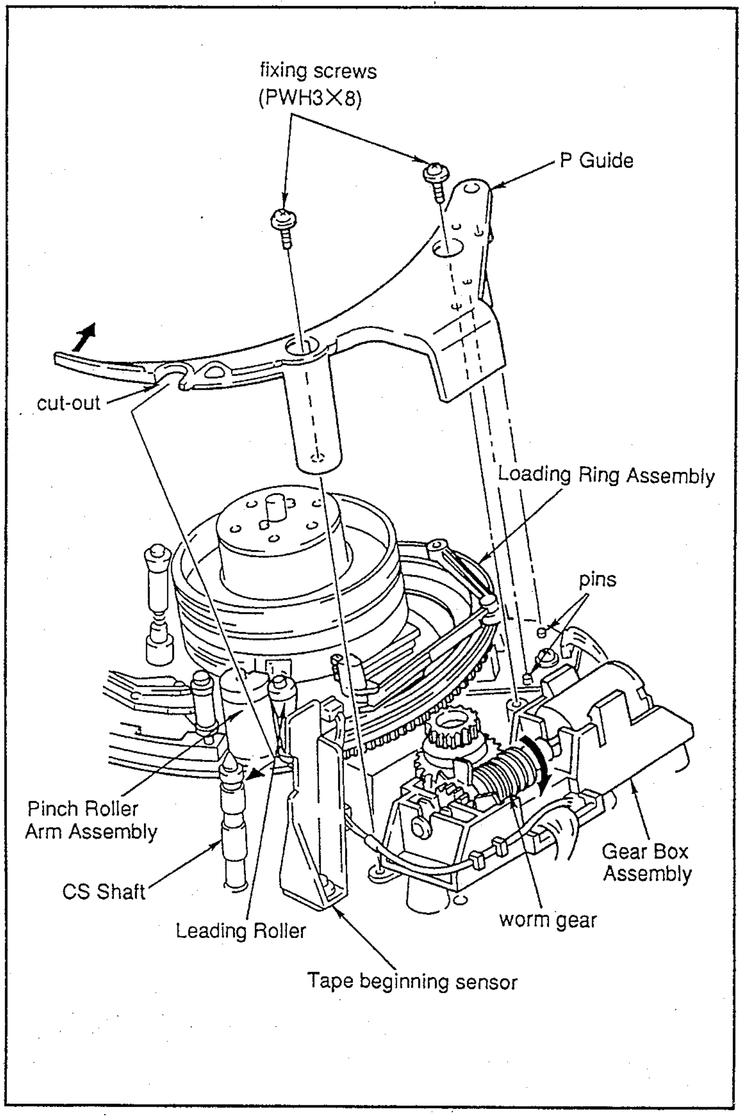
Audio/Timecode Head Height Check

↓ 7-9

Audio/Timecode Head Phase Check

Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its cut-out in the direction of arrow.
2. Rotate the worm gear of the Gear Box Assembly with finger until the Leading Roller of the Loading Ring Assembly comes beside to the tape beginning sensor.


fixing screws
(PWH3X8)
P Guide
cut-out
Loading Ring Assembly
pins
Pinch Roller
Arm Assembly
Gear Box
Assembly
CS Shaft
Leading Roller
worm gear
Tape beginning sensor

3. Remove the Stop washer 2.3 from the top of the Pinch Roller Assembly. Remove the Pinch Roller Assembly from the Loading Ring Assembly

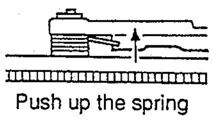
Installation

4. Apply a drop of the Sony oil on the surface of Pinch Roller Shaft. (Refer to Fig-2)
5. Install the Pinch Return Spring to the Pinch Roller Shaft of the Loading Ring Assembly with its longer end on the top. Push fully the portion "A" of the spring toward the direction of the arrow C.
6. Install a new Pinch Roller Arm Assembly to the Pinch Roller Shaft as shown so that the portion "A" of the Pinch Return Spring is hooked on the Arm Base. (Refer to Fig-1)
7. Push up the portion "B" of the Pinch Return Spring to hook it on the spring stay of the Loading Ring Assembly
8. Secure the Pinch Roller Arm Assembly with the Stop washer 2.3.
9. Move the Pinch Roller Arm Assembly in the direction of arrow D. Check that it returns to the home position smoothly when it is unhanded.

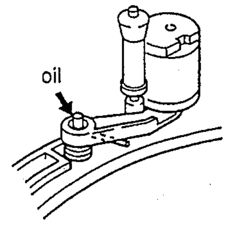
Adjustment after replacement

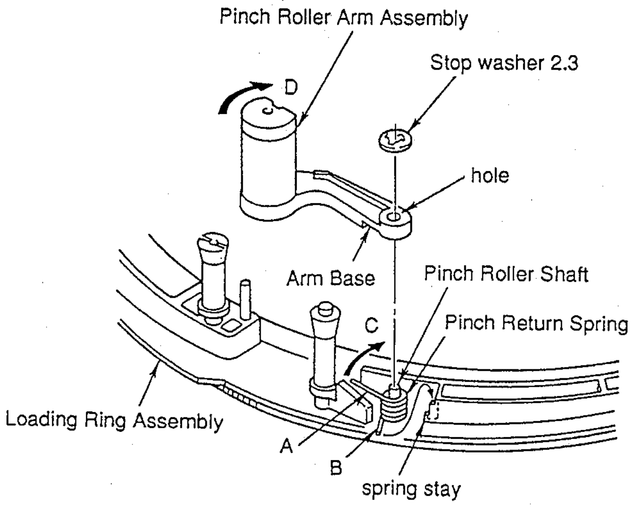
10. Perform the Pinch Press Assembly Position Adjustment (Refer to section 6-17-1.)
11. Perform the Tape Path Check
    (Refer to section 7-3.)
12. Perform the Audio/Timecode Head Height Check.
    (Refer to section 7-8.)
13. Perform the Audio/Timecode Head Phase Check
    (Refer to section 7-9.)

[Fig-1]


Push up the spring

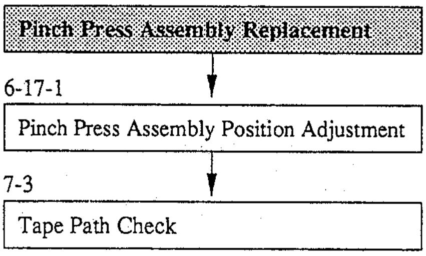
[Fig-2]




Pinch Roller Arm Assembly
Stop washer 2.3
D
hole
Arm Base
Pinch Roller Shaft
C
Pinch Return Spring
Loading Ring Assembly
A
B
spring stay

6-16. PINCH PRESS ASSEMBLY REPLACEMENT

Replacement flow chart


Pinch Press Assembly Replacement
6-17-1
Pinch Press Assembly Position Adjustment
7-3
Tape Path Check

Removal

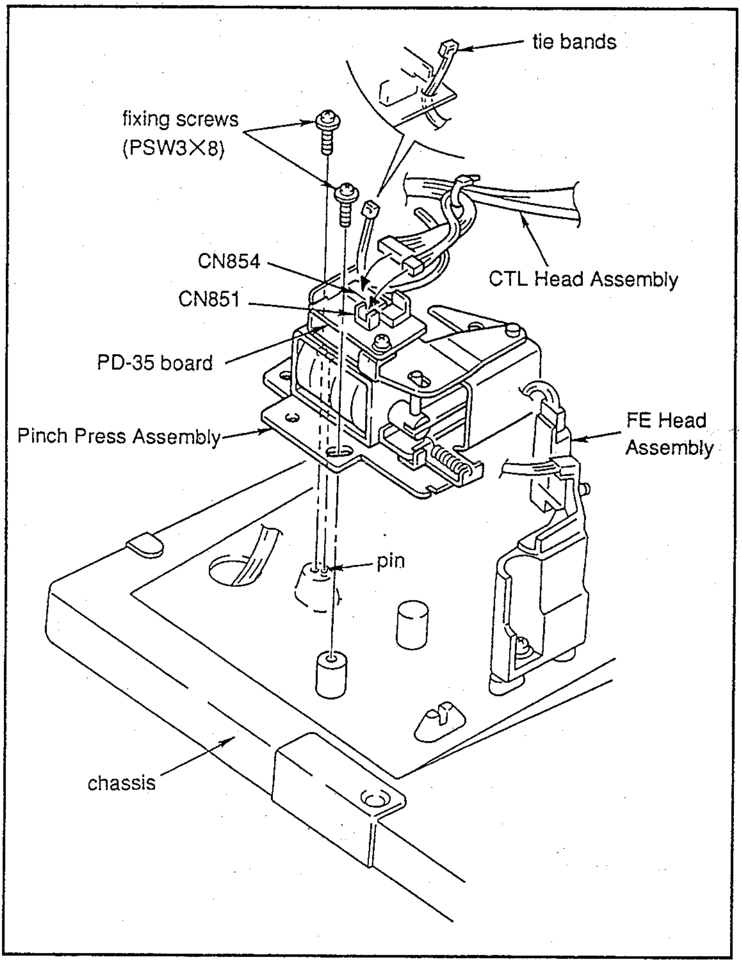
1. Cut the tie band holding the PD-35 board.
2. Unplug the two connectors (CN851, CN854) from the PD-35 board.
3. Remove the two screws securing the Pinch Press Assembly. Remove the Pinch Press Assembly from chassis.

Installation

4. Align the hole of a new Pinch Press Assembly with the pin on the chassis and install it with two fixing screws.
5. Insert the two connectors (CN851, CN854) to the mating connectors of the PD-35 board.
6. Clamp the harnesses of the Pinch Press Assembly, CTL Head Assembly and FE Head Assembly on the PD-35 board with tie band.

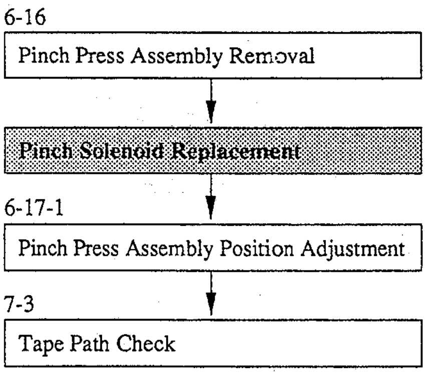
Adjustment after replacement

7. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-1.)
8. Perform the Tape Path Check.
   (Refer to section 7-3.)


tie bands
fixing screws
(PSW3X8)
CN854
CN851
CTL Head Assembly
PD-35 board
Pinch Press Assembly
FE Head Assembly
pin
chassis

6-17. PINCH SOLENOID REPLACEMENT

Replacement flow chart


6-16
Pinch Press Assembly Removal
Pinch Solenoid Replacement
6-17-1
Pinch Press Assembly Position Adjustment
7-3
Tape Path Check

Removal

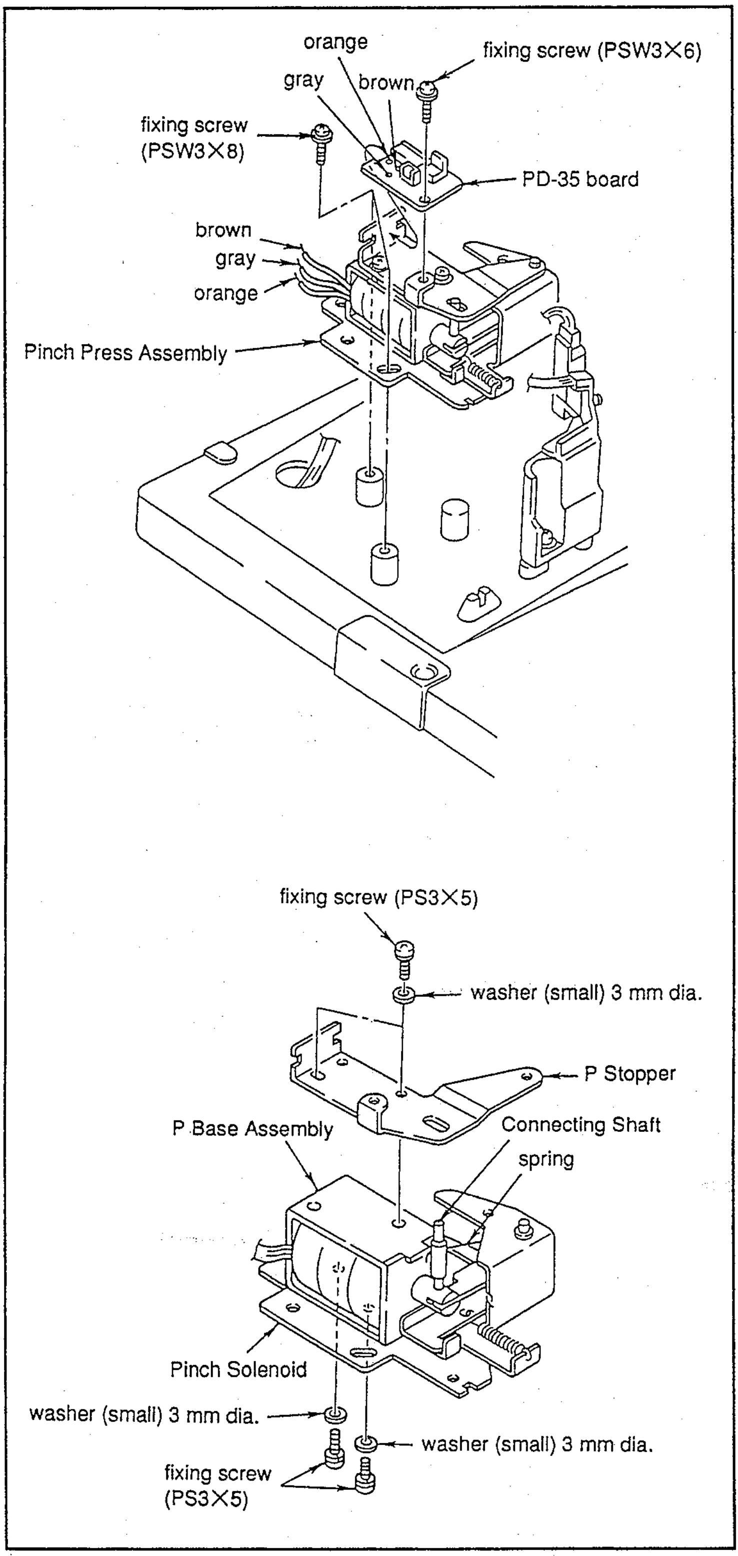
1. Remove the Pinch Press Assembly. (Refer to section 6-16.)
2. Remove the screw securing the PD-35 board. Unsolder the three leads (orange, gray, brown) coming from the Pinch Solenoid to the PD-35 board.
3. Remove the two screws (PS3 × 5) and washers as shown and remove the P Stopper.
4. Extract the Connecting Shaft.
5. Remove the two screws and washers and remove the Pinch Solenoid from the P Base Assembly.

Installation

6. Install a new Pinch Solenoid on the P Base Assembly using the screws (PS3 × 5) via washers (small) as shown.
7. Reverse the above steps 4 through 1 of removal to install a new Pinch Solenoid.

Adjustment after replacement

8. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-1.)
9. Perform the Tape Path Check. (Refer to section 7-3.)


orange
gray
brown
fixing screw (PSW3×6)
fixing screw (PSW3×8)
PD-35 board
brown
gray
orange
Pinch Press Assembly
fixing screw (PS3×5)
washer (small) 3 mm dia.
P Stopper
P Base Assembly
Connecting Shaft
spring
Pinch Solenoid
washer (small) 3 mm dia.
washer (small) 3 mm dia.
fixing screw (PS3×5)

6-17-1. Pinch Press Assembly Position Adjustment.

Mode : Thread the unit without inserting a cassette. Keep the PLAY mode.
(The mode in which the Pinch Roller is pressed.)

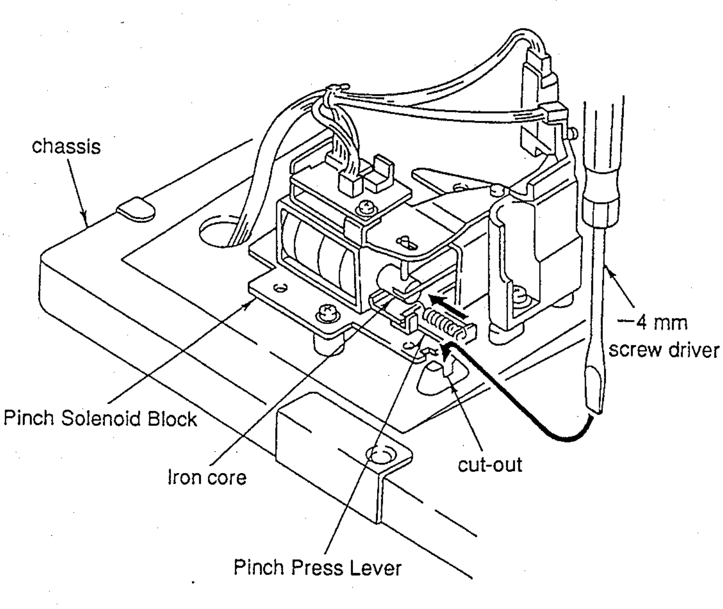
Tool :
Thickness gauge : 9-911-053-00

Check procedure

1. Check that the clearance between the Pinch Press Lever and Pinch Limiter satisfies the specification. (Refer to Fig-1)

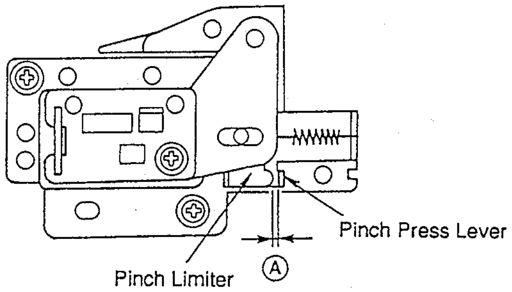
Adjustment

2. Loosen the two screws securing the Pinch Solenoid Assembly by 1/4 to 1/2 turn. (Refer to Fig-2)
3. Insert a –4 mm flat screw driver tip into the cut-out between the Pinch Press Assembly and chassis. Adjust position of the Pinch Press Assembly to satisfy the specification.
4. After tightening the screws, check the specification again following the above check procedure.

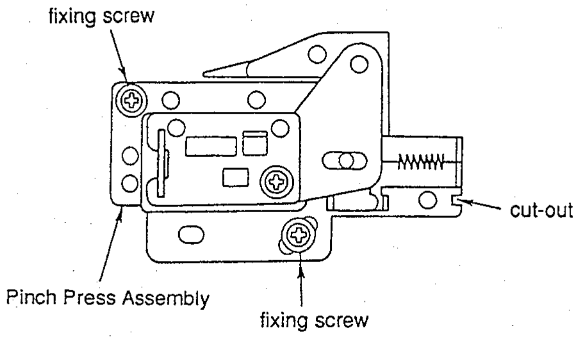

chassis
–4 mm
screw driver
Pinch Solenoid Block
cut-out
Iron core
Pinch Press Lever

[Fig-1]

Specification :
Ⓐ = 0.7 ± 0.1 mm


Pinch Press Lever
Pinch Limiter
Ⓐ

[Fig-2]


fixing screw
cut-out
Pinch Press Assembly
fixing screw

6-18. GEAR BOX MOTOR REPLACEMENT

Tools :

L shaped wrench (across flat has 1.27 mm) : 7-700-736-01

Thickness gauge : 9-911-053-00

Replacement flow chart

P Guide Removal

↓

Gear Box Motor Replacement

↓

6-18-1 Gear Box Assembly Position Adjustment

↓

4-4 Gear Box Motor Operation Check

Removal

Precaution : When removing the P Guide, do not contact with the tape beginning sensor.

1. Rotate the worm of the Gear Box with finger until the Loading Ring arrives at the position shown in the figure. (Refer to Fig-1)
2. Remove the two fixing screws. Remove the P Guide from the CS Shaft by pulling its cut-out in the direction of arrow.
3. Unplug the two connectors (CN941, CN942) connected to the Gear Box Assembly.
4. Remove the two fixing screws securing the Gear Box Assembly. Remove the Gear Box Assembly from the Chassis Assembly.

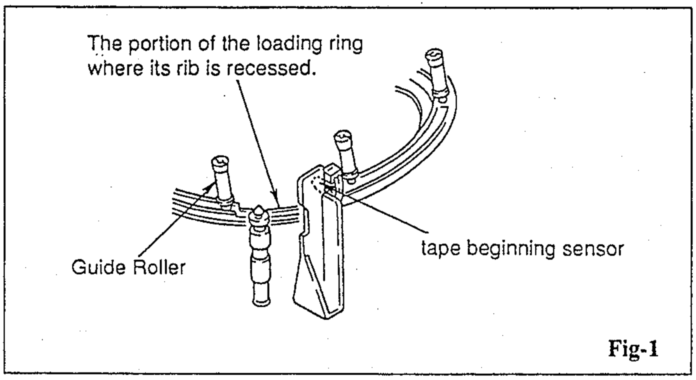
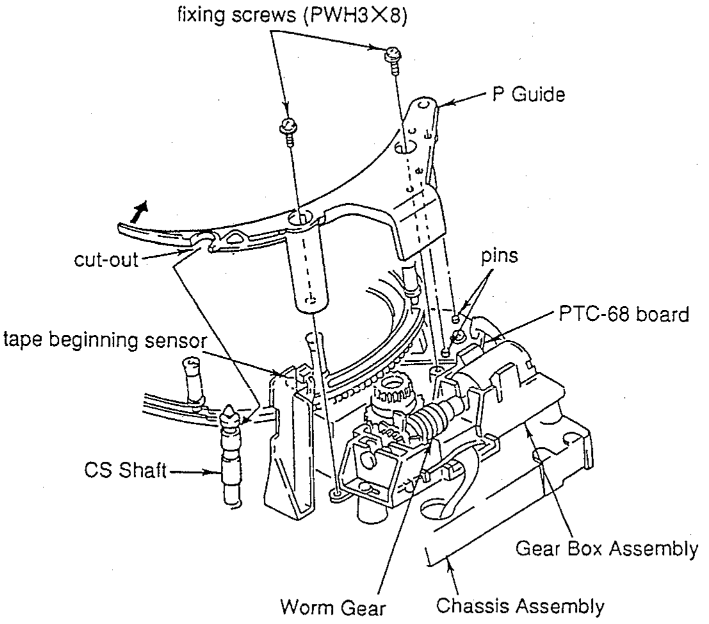
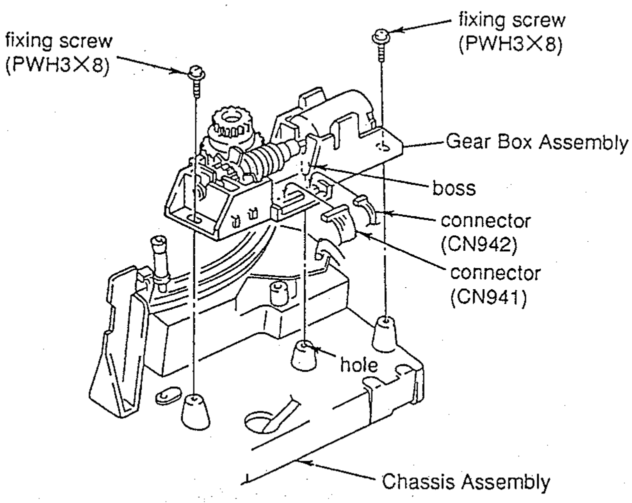
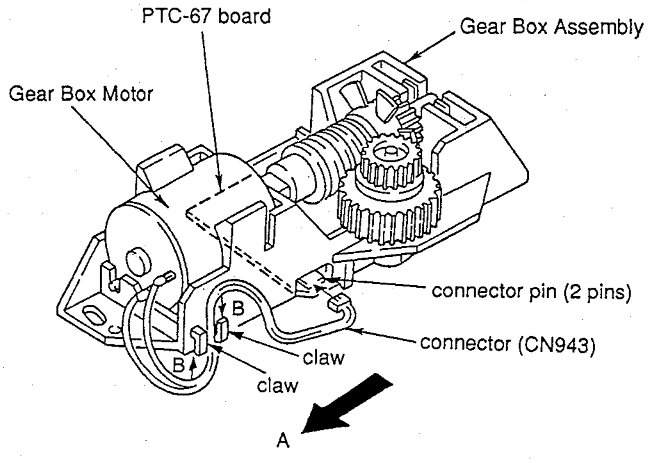

The portion of the loading ring where its rib is recessed.
Guide Roller
tape beginning sensor

Fig-1


fixing screws (PWH3X8)
P Guide
cut-out
pins
PTC-68 board
tape beginning sensor
CS Shaft
Gear Box Assembly
Worm Gear
Chassis Assembly


fixing screw (PWH3X8)
fixing screw (PWH3X8)
Gear Box Assembly
boss
connector (CN942)
connector (CN941)
hole
Chassis Assembly

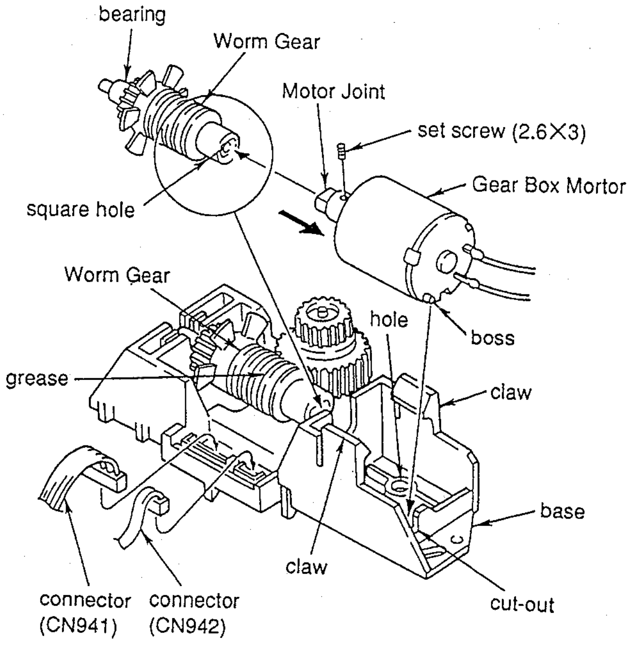
5. Remove the Gear Box Motor harness from the two claws of the Gear Box Assembly.
6. Unplug the Gear Box connector (CN943) from the PTC-67 board.


PTC-67 board
Gear Box Assembly
Gear Box Motor
connector pin (2 pins)
B
connector (CN943)
B
claw
claw
A

7. Loosen the set screw securing the motor joint by 1/4 to 1/2 turn. Push the motor joint in the direction of arrow.
8. Pull the Gear Box Motor upward strongly, or push the Gear Box Motor out from the hole of the base. Remove the Gear Box Motor from the Gear Box Block.
9. Extract the motor joint from the Gear Box Motor.

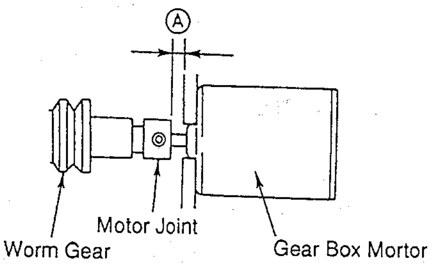
Installation

10. Insert the motor joint into the new Gear Box Motor.
11. Align the boss of the Gear Box Motor with the cut-out of the Gear Box Assembly. Push the Gear Box Motor strongly until it is locked with two claws of the Gear Box Assembly.
12. Align the motor joint with the square hole of the worm gear, and slide it. Tighten the set screw at the position where the motor joint position satisfies the specification.
13. Insert the Gear Box Motor connector (CN943) into the PTC-67 board.
14. Remove play of the Gear Box Motor harness in the A direction. Push the harness into the two claws from the direction of arrow B.
15. Align the boss of the Gear Box Assembly with the hole of the Chassis Assembly. Secure them with two fixing screws.
16. Insert the two connectors (CN942, CN941) to the Gear Box Block.


bearing
Worm Gear
Motor Joint
set screw (2.6X3)
Gear Box Mortor
square hole
Worm Gear
hole
boss
grease
claw
base
claw
connector (CN941)
connector (CN942)
cut-out

Adjustment after replacement

17. Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1)
18. Perform the Gear Box Mortor Operation Check. (Refer to section 4-4)
19. Install the P Guide. Secure it with the two fixing screws.


Ⓐ
Motor Joint
Worm Gear
Gear Box Mortor

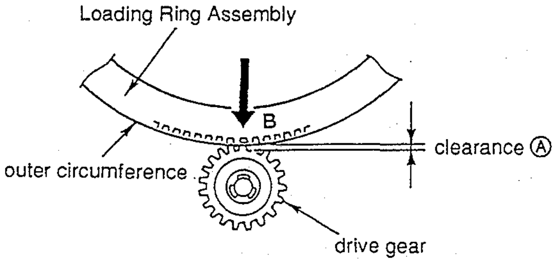
Specification :
Ⓐ=4 ± 0.1 mm

6-18-1. Gear Box Assembly Position Adjustment

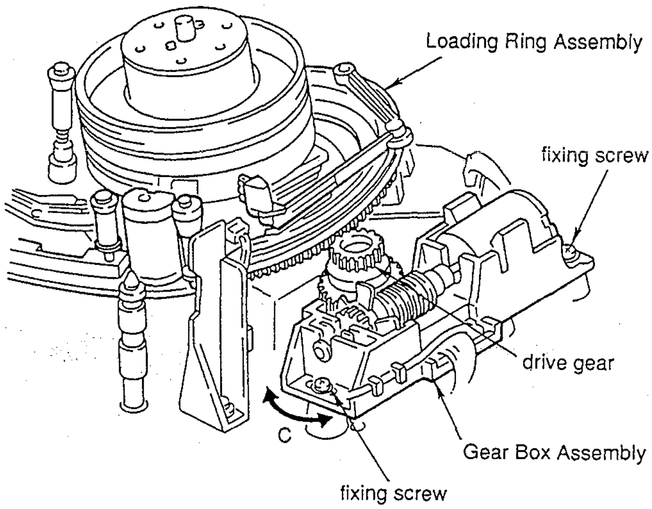
Mode : Unthreading end mode
Tool : Wire clearance check gauge
J-6152-450-A

Adjustment Procedure

1. Loosen the two fixing screws by 1/2 to 1 turn.
2. Pull the Loading Ring Assembly fully in the direction of arrow **B** to remove play.
3. Move the position of the Gear Box Assembly in the direction of arrow **C** until the clearance Ⓐ between the outer circumference of the Loading Ring and the bottom end of the Drive Gear tooth satisfies the specification. Tighten the two screws.
4. Check that the clearance Ⓐ satisfies the specification.


Loading Ring Assembly
B
clearance Ⓐ
outer circumference
drive gear

Specification : Ⓐ=0 to 0.1 mm


Loading Ring Assembly
fixing screw
drive gear
C
Gear Box Assembly
fixing screw

6-19. WORM GEAR REPLACEMENT (GEAR BOX)

Tools :

L shaped wrench (across flat has 1.27 mm)	: 7-700-736-01
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-662-010-04
Sony oil (NT-68)	: 7-661-018-18
Thickness gauge	: 9-911-053-00

Replacement flow chart

P Guide Removal

↓

Worm Gear Replacement

↓

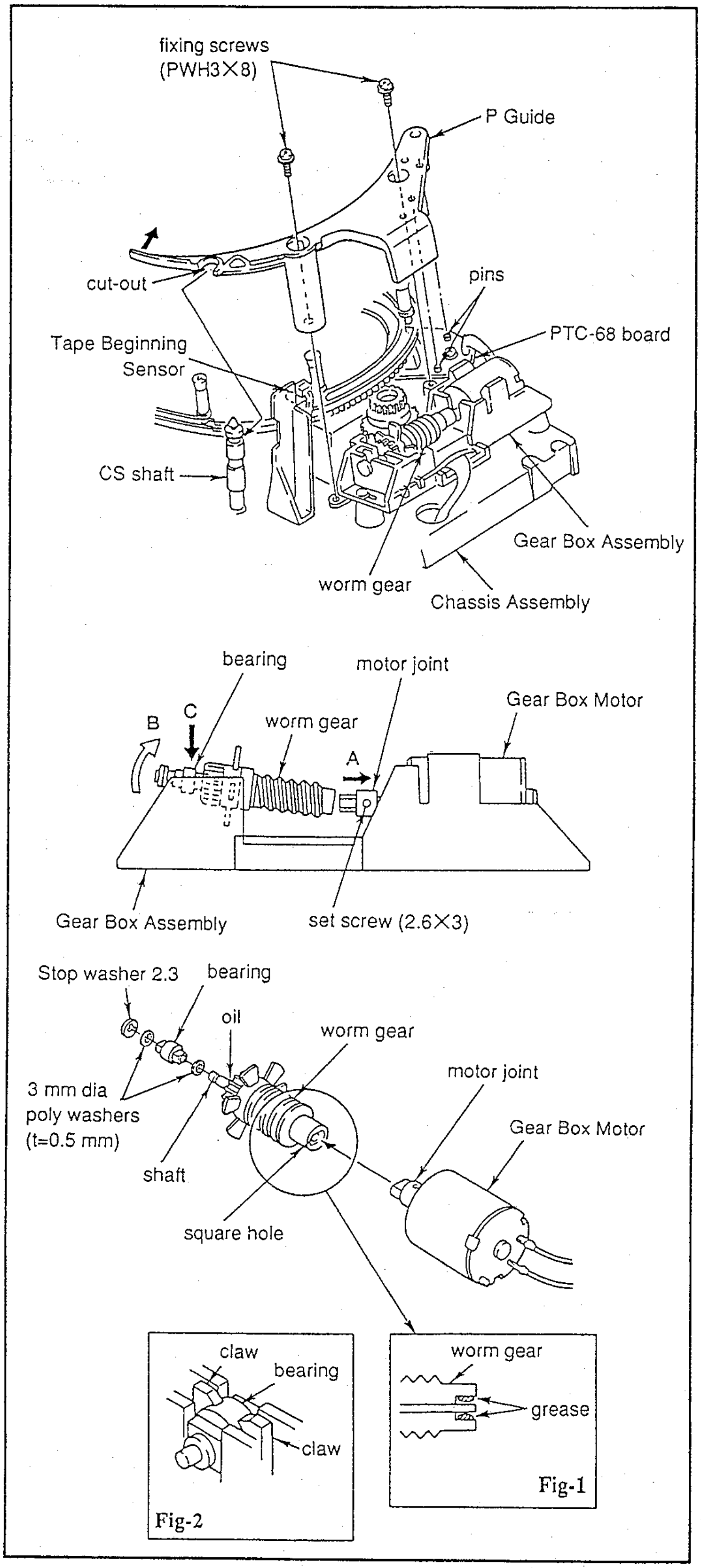
Motor Joint Position Adjustment

Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its cut-out in the direction of arrow.
2. Loosen the set screw (2.6×3) by 1/4 to 1/2 turn holding the Motor Joint. Push the Motor Joint in the direction **A**.
3. Raise the bearing of the Worm Gear in the direction **B** to remove the Worm Gear.
4. Remove the stop washer 2.3 of the Worm Gear. Remove the two 3 mm dia poly washer (t=0.5 mm) and bearing.

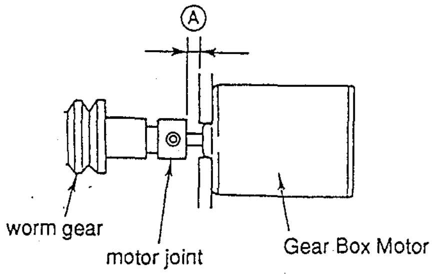
Installation

5. Clean the shaft of new Worm Gear with cleaning piece moistened with cleaning fluid.
6. Insert two 3 mm dia poly washers and bearing on the Worm Gear shaft, as shown. Secure them with stop washer.
7. Apply a drop of Sony oil between the Worm Gear and bearing. Coat Sony grease thin on the square hole of Worm Gear. (Refer to Fig-1)
8. Push the Worm Gear bearing all the way into the Gear Box Assembly from the direction **C** until the claw locks. (Refer to Fig-2)


fixing screws
(PWH3X8)
P Guide
cut-out
pins
PTC-68 board
Tape Beginning
Sensor
CS shaft
Gear Box Assembly
worm gear
Chassis Assembly
bearing
motor joint
Gear Box Motor
B
C
worm gear
A
Gear Box Assembly
set screw (2.6X3)
Stop washer 2.3
bearing
oil
worm gear
motor joint
3 mm dia
poly washers
(t=0.5 mm)
Gear Box Motor
shaft
square hole
claw
bearing
claw
Fig-2
worm gear
grease
Fig-1

Adjustment after replacement

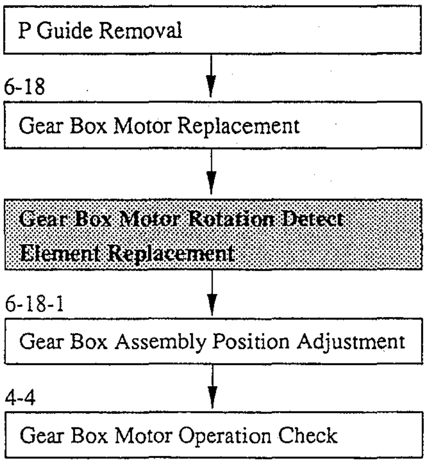
9. Align the Motor Joint with the square hole of the Worm Gear. Tighten the set screw so that the Motor Joint position satisfies the specification.
10. Install the P Guide with fixing screw.


Ⓐ
worm gear
motor joint
Gear Box Motor

Specification :
Ⓐ=4 ± 0.1 mm

6-20. GEAR BOX MOTOR ROTATION DETECT ELEMENT REPLACEMENT

Replacement flow chart


P Guide Removal
6-18
Gear Box Motor Replacement
Gear Box Motor Rotation Detect Element Replacement
6-18-1
Gear Box Assembly Position Adjustment
4-4
Gear Box Motor Operation Check

Removal

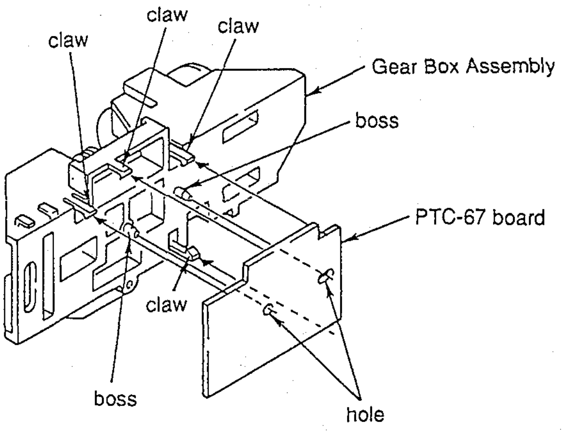
1. Remove the P. Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
2. Remove the Gear Box Assembly referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
3. Remove the PTC-67 board by unlocking the four claws of the Gear Box Assembly.
4. Unsolder the photo interrupter which is soldered to the PTC-67 board.
5. Install a new photo interrupter to the PTC-67 board by soldering.

Installation

6. Align the PTC-67 board with the two bosses of the Gear Box Assembly as shown. Push it into the four claws.
7. Install the Gear Box Assembly by reversing the procedures of installation. (Refer to section 6-18.)

Adjustment after replacement

8. Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1.)
9. Perform the Gear Box Motor Operation Check (Refer to section 4-4.)
10. Install the P Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)


claw
claw
claw
Gear Box Assembly
boss
PTC-67 board
claw
boss
hole

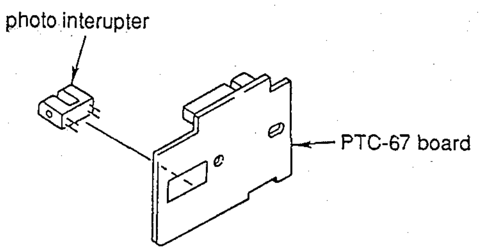


photo interupter
PTC-67 board

6-21. CAPSTAN MOTOR REPLACEMENT

Mode : Rotate the worm of the Gear Box with finger to rotate the Loading Ring until the Cleaning Roller is pressed against the Drum.

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

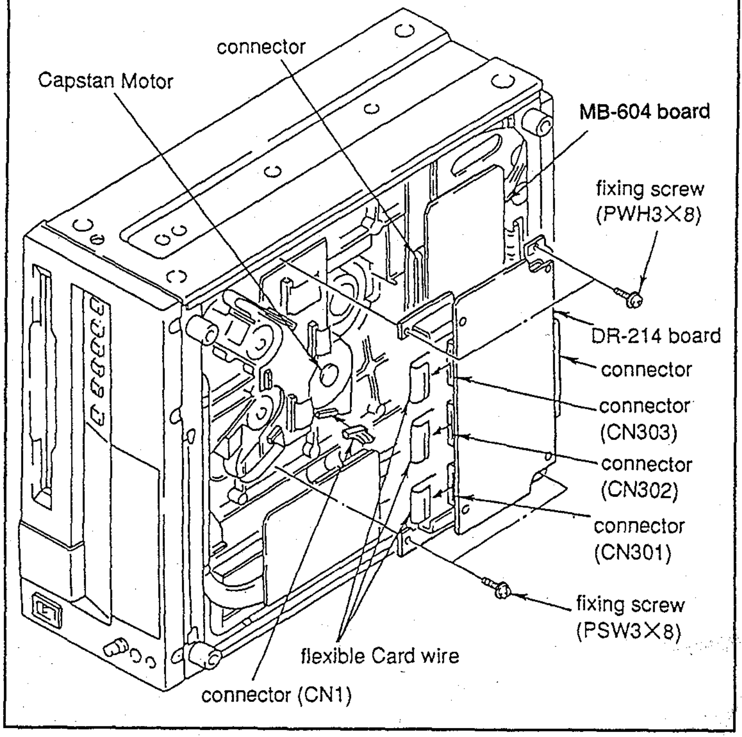
Replacement flow chart

DR-214 Board Removal
↓
Capstan Motor Replacement
↓ 4-5
Capstan FG Duty Adjustment
↓ 4-5
Capstan Speed Adjustment
↓ 4-5
Capstan Motor Operation Check
↓ 6-17-1
Pinch Press Assembly Position Check
↓ 7-3
Tape Path Check

Removal

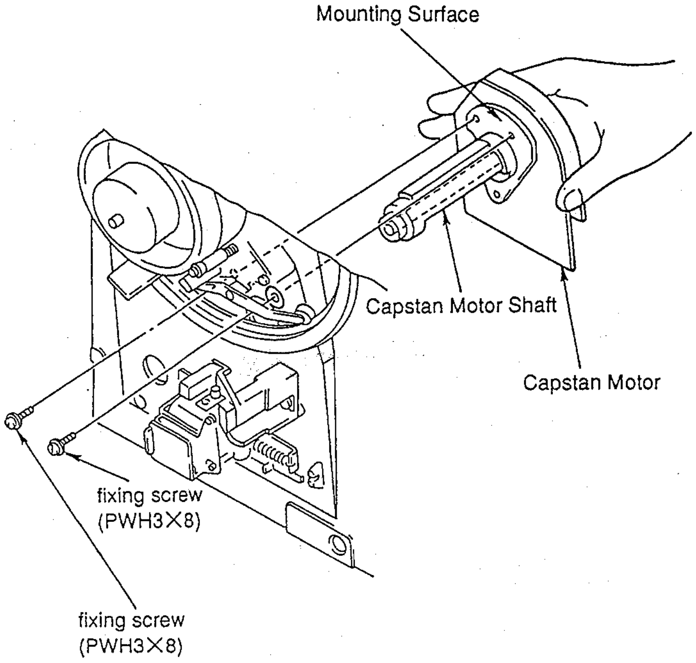
1. Stand the unit with the left side bottom.
2. Remove the four screws holding the DR-214 board.
3. Unplug connectors from DR-214 and MB-604 boards.
4. Remove the three flexible card wire (CN301, CN302, CN303) from the DR-214 board.
5. Unplug the connector (CN1) from the Capstan Motor.

<Rear view of chassis>


connector
Capstan Motor
MB-604 board
fixing screw
(PWH3X8)
DR-214 board
connector
connector
(CN303)
connector
(CN302)
connector
(CN301)
fixing screw
(PSW3X8)
flexible Card wire
connector (CN1)

6. While holding the Capstan Motor with finger from the rear of the Chassis, remove the two screws holding the Capstan Motor from the front of the Chassis. Remove the Capstan Motor.

Precaution 1 : Hold the Capstan Motor with hand so as not to drop it.
Precaution 2 : Pay utmost attention not to injure the Tape Guides around the Capstan Motor.



(This screw cannot be removed because the base of the Cleaning Roller has the drop safe.)

Installation

7. Clean the mounting surface of the new Capstan Motor, and the mounting surface of the Chassis with cleaning piece moistened with cleaning fluid.
8. Insert the Capstan Motor from the rear of the Chassis. Tighten the two fixing screws to install the Capstan Motor.

Precaution 1 : Pay utmost attention not to injure the Capstan Motor Shaft.
Precaution 2 : Pay utmost attention not to injure the Tape Guides around the Capstan Motor.

9. Connect the connector (CN1) to the Capstan Motor.
10. Connect the three flexible card wire (CN301, CN302, CN303) to the DR-214 board.
11. Connect the DR-214 board connector to the MB-604 board.
12. Install the DR-214 board with four fixing screws.

Adjustment after replacement

13. Perform the Capstan FG Duty Adjustment.
    (Refer to section 4-5.)
14. Perform the Capstan Speed Adjustment.
    (Refer to section 4-5.)
15. Perform the Capstan Motor Operation Check.
    (Refer to section 4-5.)
16. Perform the Pinch Press Assembly Position Check.
    (Refer to section 6-17-1.)
17. Perform the Tape Path Check.
    (Refer to section 7-3.)

6-22. CTL HEAD REPLACEMENT

Mode : Unthreaing end mode

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

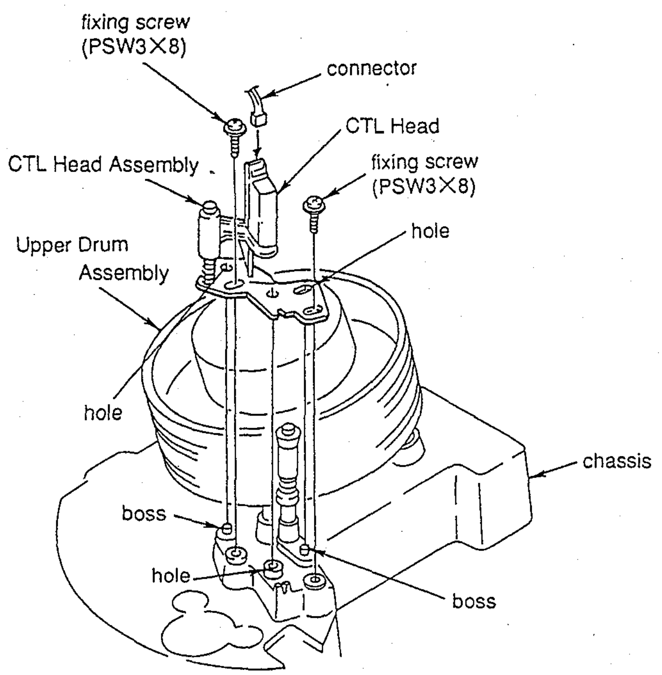
CTL Head Replacement
↓
7-6 CTL Head Height Adjustment
↓
7-7 CTL Head Position Adjustment
↓
7-11 Audio/CTL Head Position Check
↓
7-3 Tape Path Check

Removal

1. Rotate the Upper Drum Assembly with finger so that the video head is positioned far from the CTL head.
2. Unplug the connector from the CTL Head

Precaution : When removing the CTL Head Assembly, NEVER touch the CTL Head Assembly with the Upper Drum Assembly.

3. Remove the two screws holding the CTL Head Assembly.


fixing screw (PSW3×8)
connector
CTL Head
CTL Head Assembly
fixing screw (PSW3×8)
hole
Upper Drum Assembly
hole
chassis
boss
hole
boss

4. Remove the loose-proof nut (M2) and washer (2 mm dia) holding the CTL Head Base Plate. Remove the CTL Head Base Plate.
5. Remove the two fixing screws (P2×3) holding the CTL Head from the bottom. Remove the CTL Head from the CTL Head Base Plate.
6. Unsolder the connector (2 pins) of the CTL Head. Remove the CTL Head.

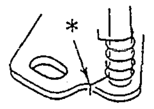
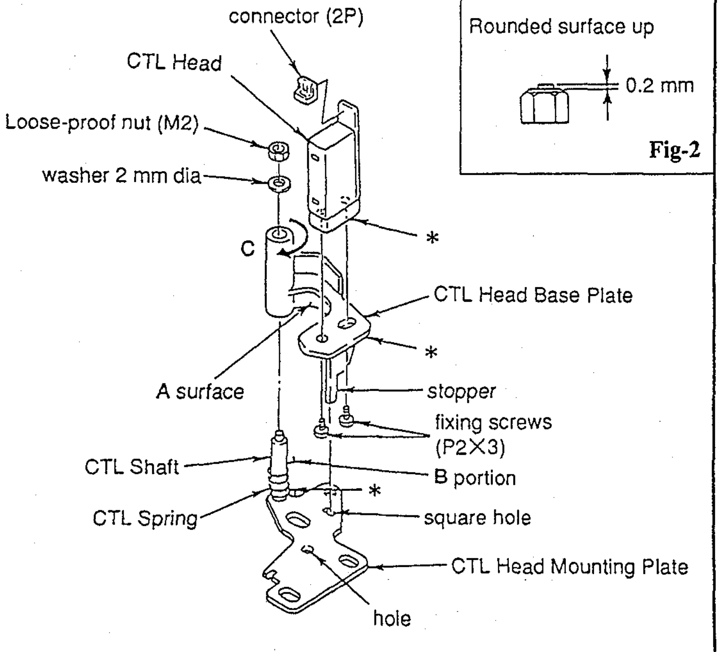

*

Fig-1

Rounded surface up
0.2 mm

Fig-2


connector (2P)
CTL Head
Loose-proof nut (M2)
washer 2 mm dia
C
*
CTL Head Base Plate
*
A surface
stopper
fixing screws (P2×3)
CTL Shaft
B portion
*
CTL Spring
square hole
CTL Head Mounting Plate
hole

Installation

7. Connect the connector (2 pins) to a new CTL Head.
8. Clean the mounting surface of the CTL Head and the mounting surface of the CTL Head Base Plate with cleaning piece moistened with cleaning fluid.
9. Install the CTL Head to the CTL Head Base Plate with * marked positions in parallel each other using two screws. (Refer to Fig-1)
10. Hook the CTL Spring on the * marked position of the CTL Head Mounting Plate. (Refer to Fig-1)
11. Insert the CTL Head Base Plate into the CTL Shaft of the CTL Head Mounting Plate. Hook the **B** portion of the CTL Spring on the plane **A** of the CTL Head Base Plate.
12. While rotating the CTL Head Base Plate in the direction **C**, insert the stopper of the CTL Head Base Plate into the square hole of the CTL Head Mounting Plate.
13. Install washer to the CTL Shaft as shown, and screw in the loose-proof nut until the CTL Shaft protrudes about 0.2 mm above the rounded surface. (Refer to Fig-2)
14. Align the hole of the CTL Head Mount Plate and that of the chassis. Secure them with two fixing screws.
15. Connect the connector to the CTL Head.

Adjustment after replacement

16. Perform the CTL Head Height Adjustment. (Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment. (Refer to section 7-7.)
18. Perform the Audio/Time code Head Position Check. (Refer to section 7-11.)
19. Perform the Tape Path Check. (Refer to section 7-3.)

6-23. FE HEAD ASSEMBLY/TAPE CLEANER ASSEMBLY REPLACEMENT

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

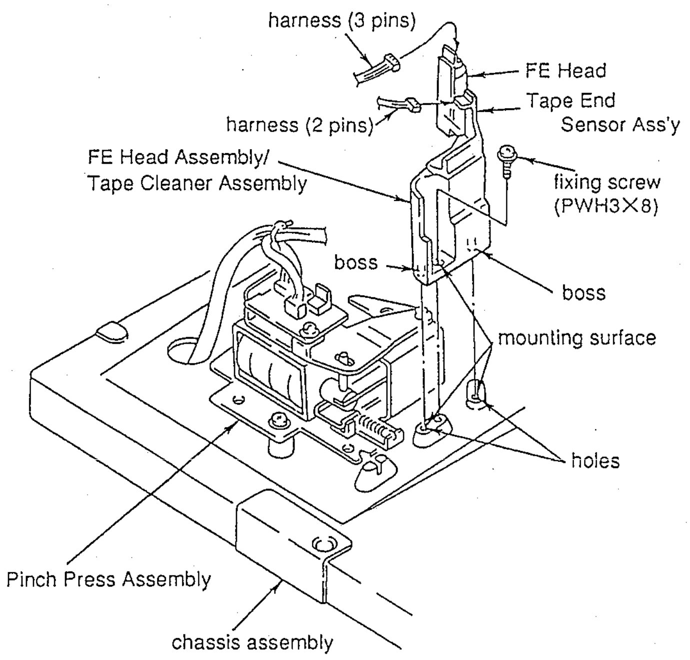
FE Head Assembly/Tape Cleaner Assembly Replacement

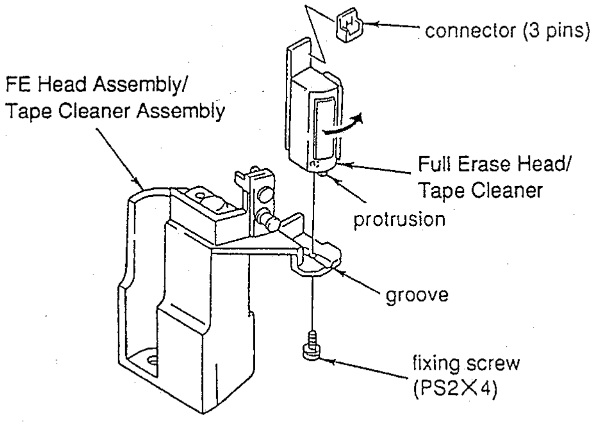
Removal

1. Unplug the connectors from the Tape End Sensor Assembly and the Full Erase Head Assembly.
2. Remove the screw holding the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head Assembly or the Tape Cleaner Assembly from chassis.
3. Remove the screw assembling the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head or the Tape Cleaner Assembly from their Assembly.
4. Unsolder the connector (3 pins) from the Full Erase Head.

Installation

5. Solder the connector (3 pins) to a new Full Erase Head.
6. Clean the respective mounting surfaces with cleaning piece moistened with cleaning fluid.
7. Align the protrusion of the Full Erase Head or Tape Cleaner Assembly, with the groove on the mounting surface. Push it in the direction of arrow and assemble them.
8. Align the boss of the FE Head Assembly or Tape Cleaner Assembly, with the holes of the slant chassis. Install it with a screw.
9. Connect the two harnesses to the Full Erase Head and Tape End Sensor Assembly.


harness (3 pins)
FE Head
Tape End Sensor Ass'y
harness (2 pins)
FE Head Assembly/ Tape Cleaner Assembly
fixing screw (PWH3X8)
boss
boss
mounting surface
holes
Pinch Press Assembly
chassis assembly


connector (3 pins)
FE Head Assembly/ Tape Cleaner Assembly
Full Erase Head/ Tape Cleaner
protrusion
groove
fixing screw (PS2X4)

6-24. AUDIO/TIMECODE HEAD REPLACEMENT

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

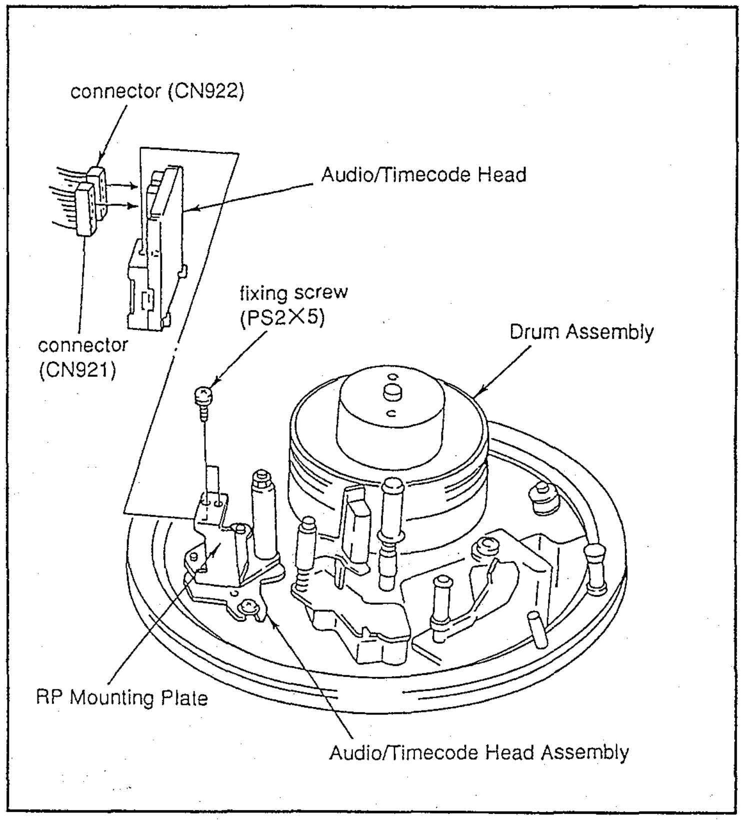
Replacement flow chart

Audio/Timecode Head Replacement
↓
7-10 Audio/ Timecode Head Head-to-tape Contact Adjustment
↓
7-3 Tape Path Check
↓
7-8 Audio/Timecode Head Height Adjustment
↓
7-9 Audio/Timecode Head Phase Adjustment
↓
7-11 Audio/Timecode Head Position Adjustment
↓
7-8 Audio/Timecode Head Height Check
↓
7-9 Audio/Timecode Head Phase Check

Removal

1. Unplug the two connectors (CN921, CN922) from the Audio/Timecode Head Assembly.
2. Remove the two screws holding the Audio/ Timecode Head. Remove the Audio/Time code Head Assembly from the RP Mounting Plate.

Precaution : When removing the Audio/ Timecode Head, pay utmost attention not injure the tape contacting surface of the Drum Assembly nor respective tape guides.


connector (CN922)
Audio/Timecode Head
fixing screw (PS2×5)
connector (CN921)
Drum Assembly
RP Mounting Plate
Audio/Timecode Head Assembly

3. Remove the screw assembling the AT Shield Case 1 and AT Shield Case 2. Remove the head.

Installation

4. Clean both the mounting surfaces of a new head and RP Mounting Plate with cleaning piece moistened with cleaning fluid.
5. Assemble the head, AT Shield Case 1 and AT Shield Case 2 with a fixing screw. (Refer to Fig-1.)
6. Install the assembled Audio/ Timecode head on the RP Mounting Plate of the Audio/ Timecode Head Assembly with two screws.

Adjustment after replacement

7. Perform the Audio/ Timecode Head Head-to-tape Contact Adjustment. (Refer to section 7-10.)
8. Perform the Tape Path Check. (Refer to section 7-3.)
9. Perform the Audio/ Timecode Head Height Adjustment. (Refer to section 7-8.)
10. Perform the Audio/ Timecode Head Phase Adjustment. (Refer to section 7-9.)
11. Perform the Audio/ Timecode Head Position Adjustment. (Refer to section 7-11.)
12. Perform the Audio/ Timecode Head Height Check. (Refer to section 7-8.)
13. Perform the Audio/ Timecode Head Phase Check. (Refer to section 7-9.)

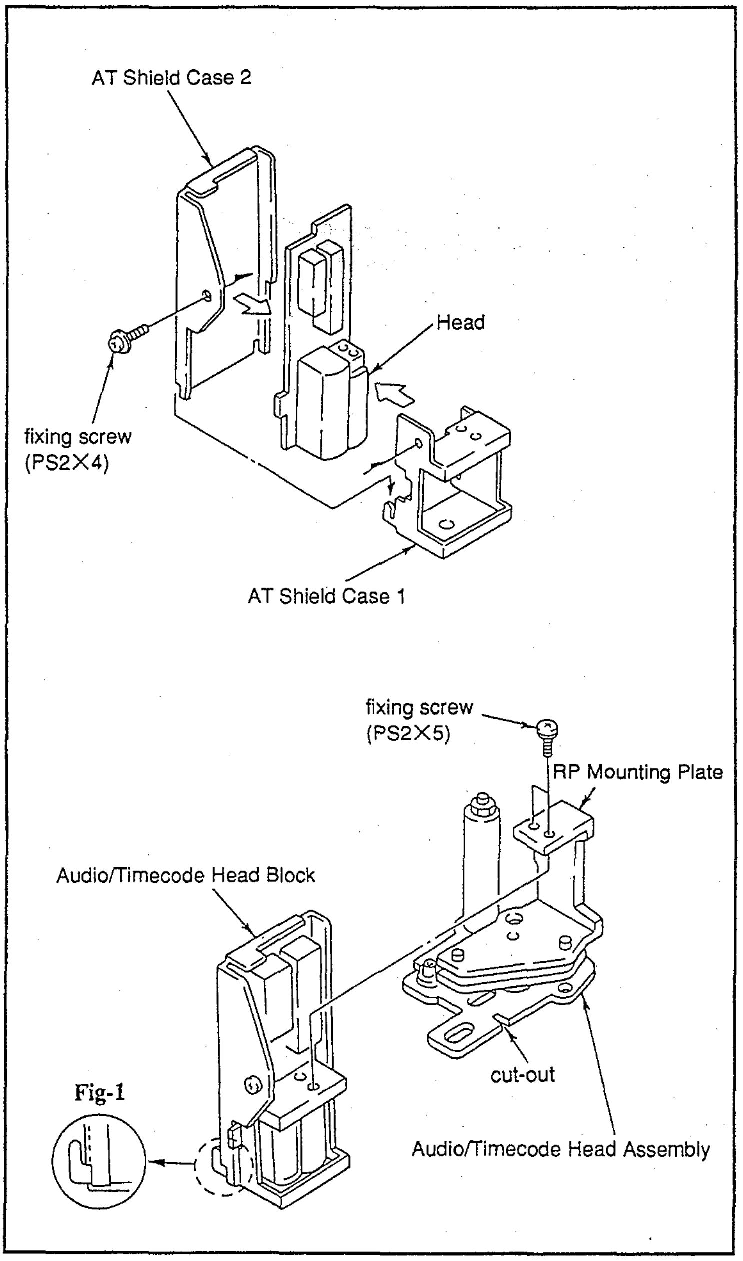

AT Shield Case 2
Head
fixing screw
(PS2X4)
AT Shield Case 1
fixing screw
(PS2X5)
RP Mounting Plate
Audio/Timecode Head Block
cut-out
Audio/Timecode Head Assembly

Fig-1

6-25. AT CLEANER REPLACEMENT

Mode : Unthreading end mode

Replacement flow chart

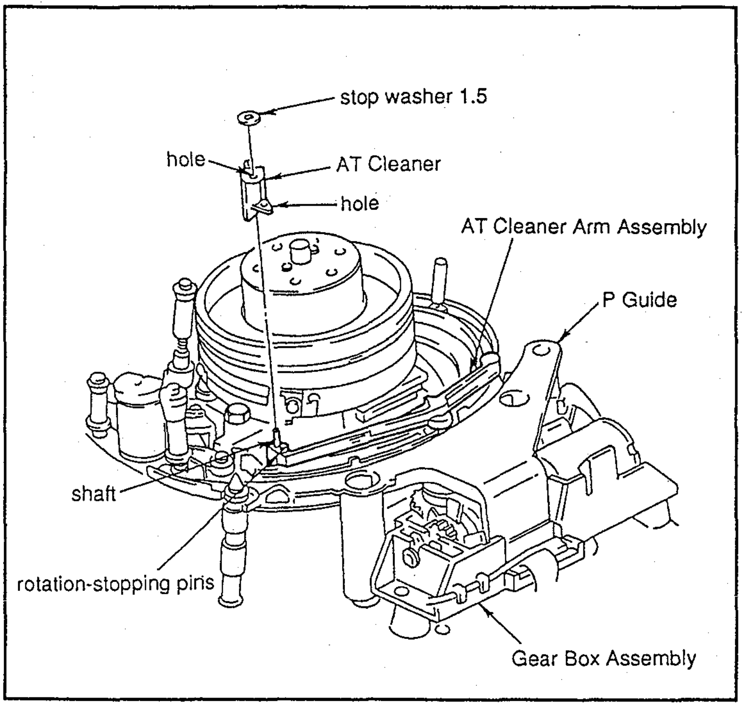
AT Cleaner Replacement

Removal

1. Remove the stop washer 1.5 holding the AT Cleaner on the AT Cleaner Arm Assembly. Remove the AT Cleaner.

Installation

2. Install a new AT Cleaner into the shaft of AT Cleaner Arm Assembly while aligning the respective holes and rotation-stopping pins.
3. Secure the AT Cleaner with a stop washer 1.5.


stop washer 1.5
hole
AT Cleaner
hole
AT Cleaner Arm Assembly
P Guide
shaft
rotation-stopping pins
Gear Box Assembly

6-26. CLEANING ROLLER REPLACEMENT

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

Cleaning Roller Replacement

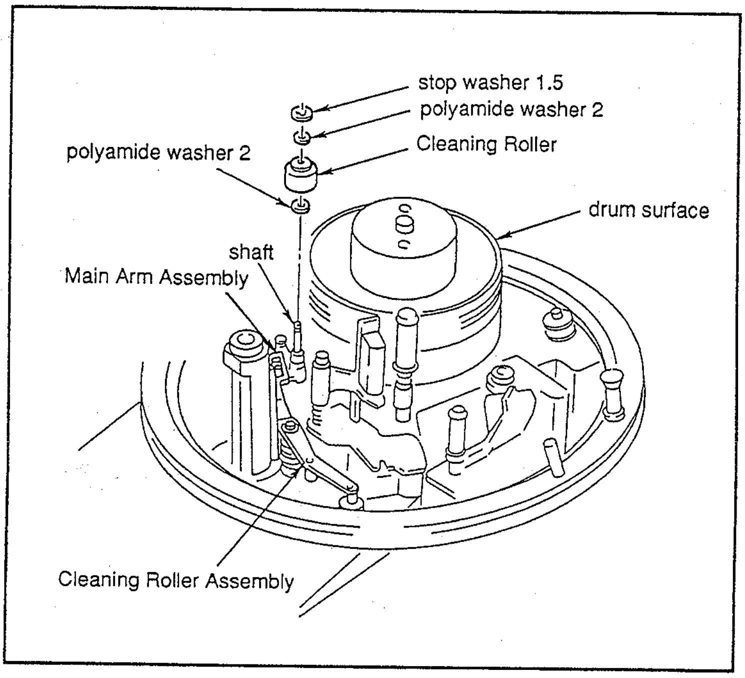
Removal

1. Remove the stop washer 1.5 holding the Cleaning Roller using tweezers taking care not to damage the drum surface. Remove the Cleaning Roller from the Cleaning Roller Assembly.

Precaution : The polyamide washers are above and below the Cleaning Roller. Pay attention not to lose them during replacement.

Installation

2. Clean the shaft of a new Cleaning Roller Assembly with cleaning piece moistened with cleaning fluid.
3. Install a new Cleaning Roller into the shaft of Cleaning Roller Assembly in the order as shown. Fix them with a stop washer 1.5.


stop washer 1.5
polyamide washer 2
Cleaning Roller
polyamide washer 2
drum surface
shaft
Main Arm Assembly
Cleaning Roller Assembly

Note : If rotation of Cleaning Roller shows any abnormality, for instance if rotation is not smooth, or any sound comes out during rotation, replace both the Main Arm Assembly and Cleaning Roller at the same time.

6-27. REPLACEMENT OF CLEANING DRIVE ARM ROLLER

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

Replacement of Cleaning Drive Arm Roller

Removal

1. Remove the fixing screw holding the Cleaning Roller Assembly. Remove the Cleaning Roller Assembly from chassis.
2. Remove the stop washer 2.3 on top of the C. Base Assembly. Remove the Drive Arm Assembly from the shaft.

Installation

3. Clean the shaft of C. Base Assembly with cleaning piece moistened with cleaning fluid.
4. Install the Drive Spring into the C. Base Assembly with the direction as shown.
5. Insert a new Drive Arm Assembly into the Drive Spring and then to the shaft while the pin is inserted in the hole as shown. Secure them with the stop washer 2.3.
6. Hook the shorter end of the Drive Spring on the portion **A**, and the longer end on the portion **B**.
7. Align the two protrusions of the Cleaning Roller Assembly with the two holes on the Slant Base Assembly. Secure them with fixing screw.

Precaution : When assembling in step 7, the roller of the Drive Arm Assembly must be located at the specified position of the Loading Ring Assembly as shown in Fig-1.

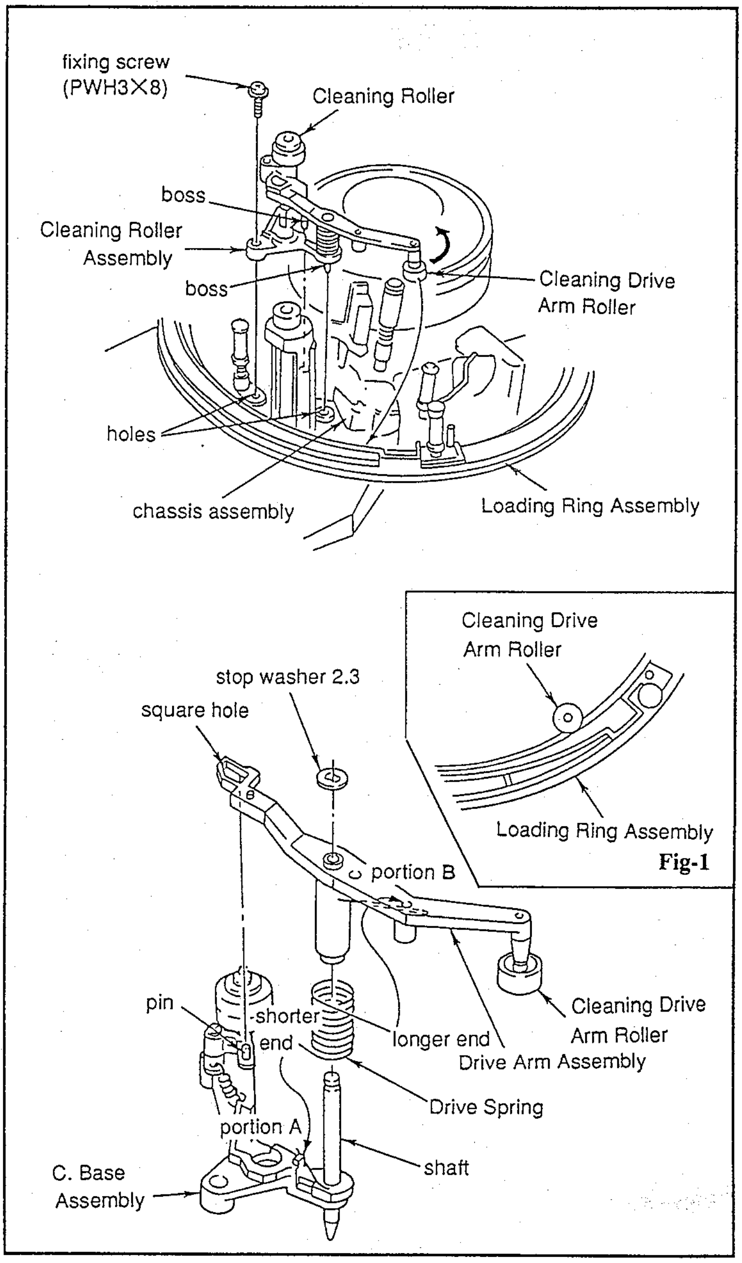

fixing screw
(PWH3X8)
Cleaning Roller
boss
Cleaning Roller Assembly
boss
Cleaning Drive Arm Roller
holes
chassis assembly
Loading Ring Assembly
Cleaning Drive Arm Roller
Loading Ring Assembly
stop washer 2.3
square hole
portion B
pin
shorter end
longer end
Cleaning Drive Arm Roller
Drive Arm Assembly
Drive Spring
portion A
shaft
C. Base Assembly

Fig-1

6-28. REPLACEMENT OF RING POSITION DETECTOR ELEMENT

Mode : In the middle of threading

Replacement flow chart

6-18

P. Guide Removal

↓

Replacement of Ring Position Detector Element

↓

4-4

Operation Check of the Ring Position Detector Element

Removal

1. Remove the P. Guide. (Refer to section 6-18.)
2. Unplug the connector (CN940) from the PTC-68 board.
3. Rotate the Worm Gear of the Gear Box to rotate the Loading Ring until the Pinch Roller comes in front of the tape beginning sensor.
4. Remove a screw fixing the PTC-68 board. Remove the PTC-68 board from the spring pins (two points).
5. Unsolder and remove the two sensors (photo interrupter GP1S54, 2 pcs) from the board.

Installation

6. Install and solder the two new sensors on the PTC-68 board.
7. Align the two holes of the PTC-68 board with two spring pins on the chassis. Fix them with a fixing screw.
8. Check for no clearance between PTC-68 board and protrusion. (Refer to Fig-1)

Adjustment after replacement

9. Perform the operation check of the Ring Position Detector Element. (Refer to section 4-4.)
10. Install the P. Guide. (Refer to section 6-18)

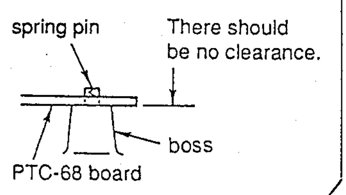
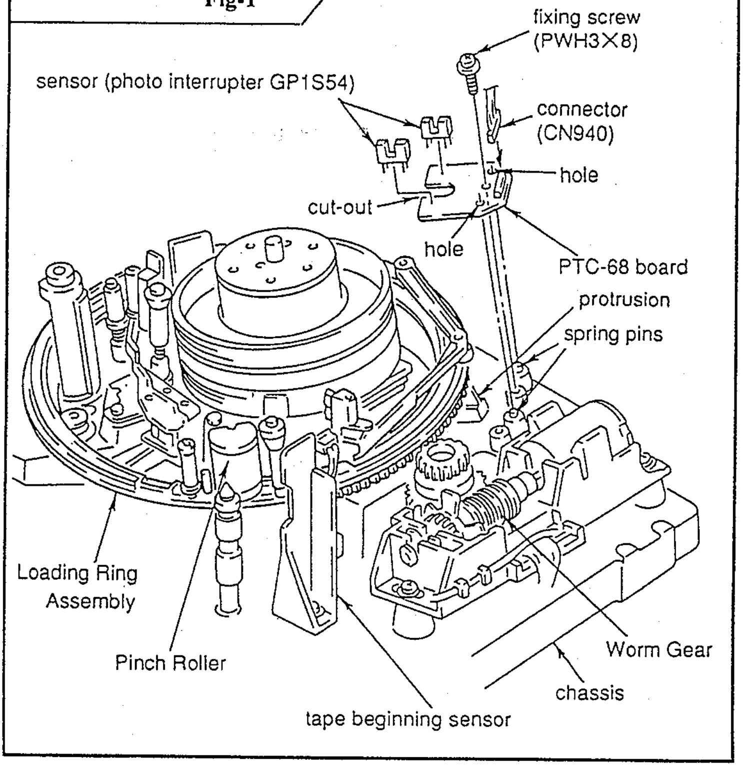

spring pin
There should be no clearance.
boss
PTC-68 board

Fig-1


fixing screw (PWH3X8)
sensor (photo interrupter GP1S54)
connector (CN940)
hole
cut-out
hole
PTC-68 board
protrusion
spring pins
Loading Ring Assembly
Pinch Roller
Worm Gear
chassis
tape beginning sensor

6-29. RING ROLLER REPLACEMENT

Mode : In the middle of threading

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

6-18
P. Guide Removal
↓
Disengaging the gears of the Gear Box Assembly
↓
Ring Roller Replacement
↓
6-33-1
Position Adjustment of the Adjustment Ring Roller/Position Adjustment of Gear Box Assembly

Removal

1. Remove the P. Guide. (Refer to section 6-18.)
2. Loosen the two fixing screws securing the Gear Box Assembly which disengages with the Loading Ring Assembly, but snugly tighten them.
3. Loosen the adjusting screw of the Adjustment Ring Roller Assembly. Push the Ring Roller in the direction of arrow **A** until the hole of the Ring Roller Mounting Plate (Refer to Fig-1) and the hole of the Ring Roller Base agree. Tighten the adjusting screw.
4. Push the Loading Ring in the direction of arrow **B**, and remove the stop washer 2.3 (three points). Remove the Ring Rollers (1), (2) and (3). (Refer to Fig-1)

Installation

5. Clean the Ring Roller shaft with cleaning piece moistened with cleaning fluid.
6. Install the new Ring Rollers (3 pcs) in respective shafts. Fix them with stop washers 2.3.
7. Push the Loading Ring Assembly in the direction of arrow **C** so that it engages with the Ring Rollers (1) and (2).

Adjustment after replacement

8. Perform the Position Adjustment of the Adjustment Ring Roller and the position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
9. Install the P. Guide. (Refer to section 6-18.)

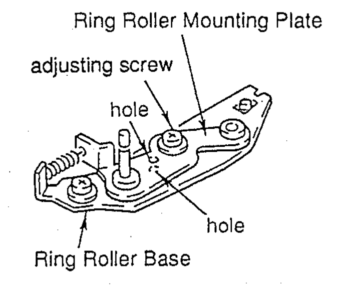
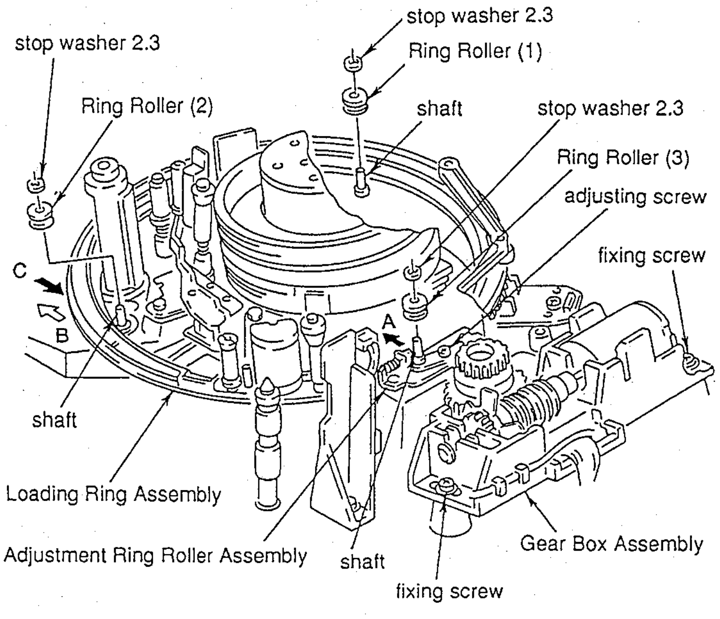

Ring Roller Mounting Plate
adjusting screw
hole
hole
Ring Roller Base

Fig-1


stop washer 2.3
Ring Roller (1)
stop washer 2.3
Ring Roller (2)
shaft
stop washer 2.3
Ring Roller (3)
adjusting screw
fixing screw
C
B
A
shaft
Loading Ring Assembly
Adjustment Ring Roller Assembly
shaft
fixing screw
Gear Box Assembly

6-30. TAPE THREADING GUIDE REPLACEMENT

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

Tape Threading Guide Replacement

7-3 ↓

Tape Path Check

Removal

1. Remove the loose-proof nut (M2) from the Ring Roller shaft on the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.
3. Remove the Tape Threading Guide with spacer (2 ×6.5).

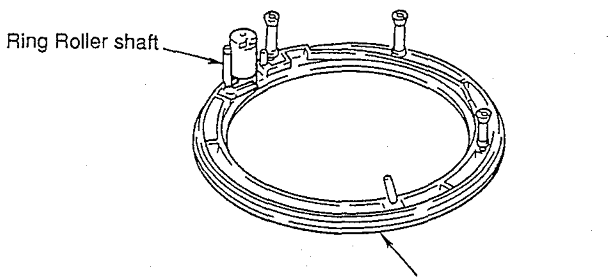
Precaution : Spacer (2×3.5) inserted underneath can be removed together. Take care not to lose it.

Installation

4. Clean the outside surface of the Ring Roller shaft on the Loading Ring Assembly with cleaning piece moistened with cleaning fluid.
5. Install a new Tape Threading Guide into the Ring Roller shaft in the direction as shown.
6. Insert the spacer (2×6.5) into the Ring Roller shaft.
7. Insert the upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter tip down.
8. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

Adjustment after replacement

9. Perform the Tape Path Check. (Refer to section 7-3.)


Ring Roller shaft
Loading Ring Assembly

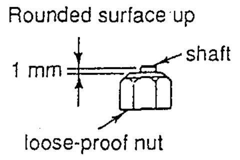
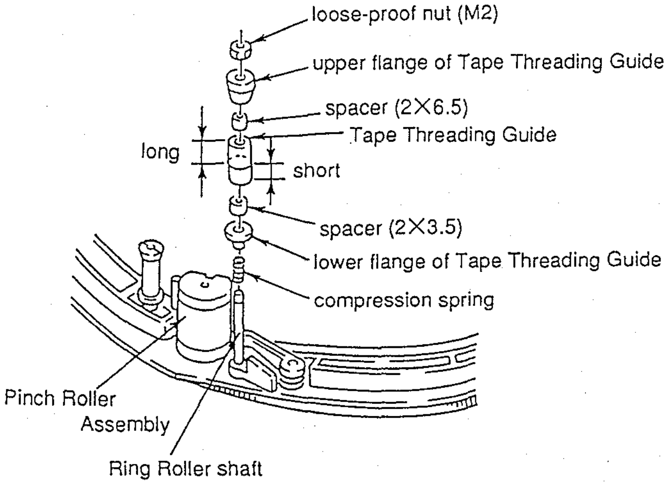

Rounded surface up
1 mm
shaft
loose-proof nut

Fig-1


loose-proof nut (M2)
upper flange of Tape Threading Guide
spacer (2X6.5)
Tape Threading Guide
long
short
spacer (2X3.5)
lower flange of Tape Threading Guide
compression spring
Pinch Roller Assembly
Ring Roller shaft

6-31. REPLACEMENT OF TAPE THREADING GUIDE UPPER FLANGE

Mode : Unthreading end mode

Replacement flow chart

Replacement Of Tape Threading Guide Upper Flange

↓

7-3 Tape Path Check

Removal

1. Remove the loose-proof nut (M2) from the Ring Roller shaft on the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.

Installation

3. Install a new upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter tip down.
4. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

Adjustment after replacement

5. Perform the Tape Path Check. (Refer to section 7-3.)

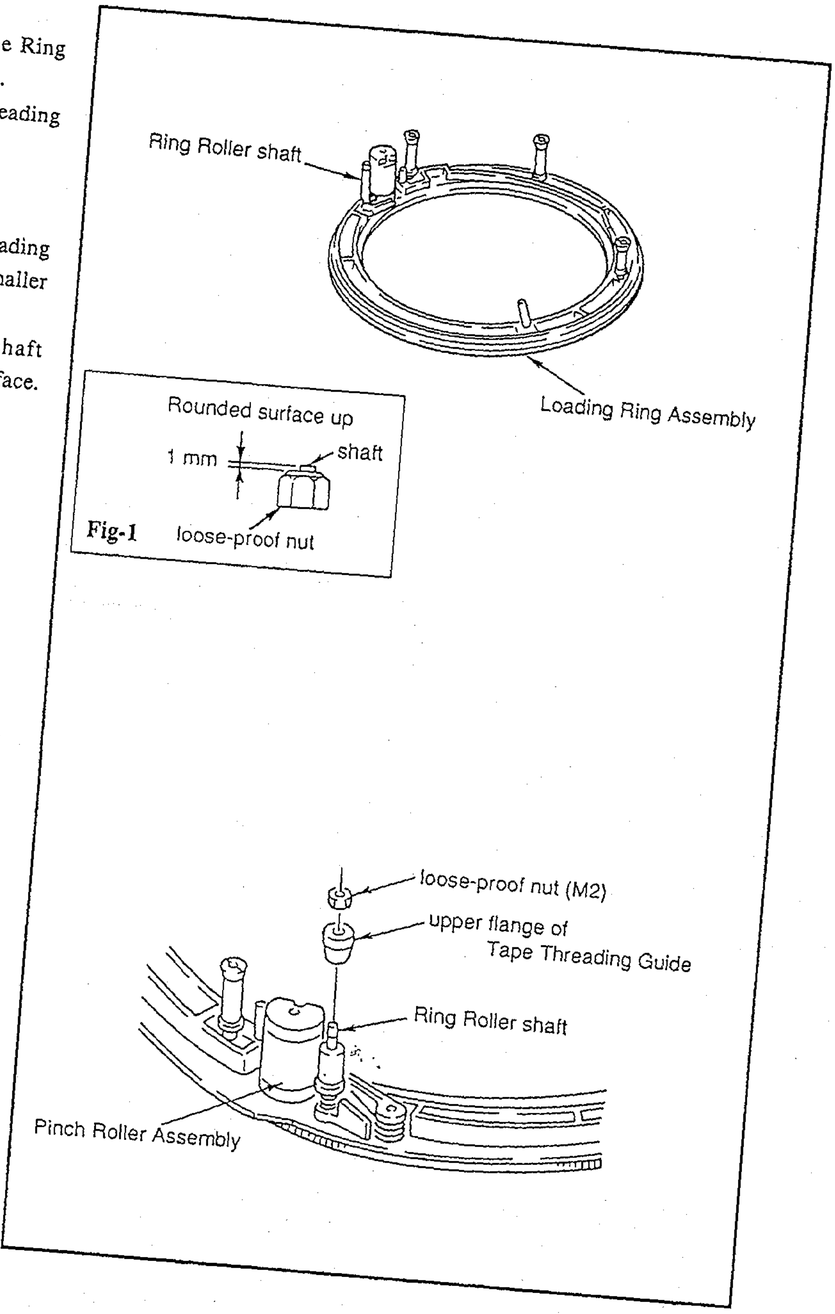

Ring Roller shaft
Loading Ring Assembly
Rounded surface up
1 mm
shaft
loose-proof nut
loose-proof nut (M2)
upper flange of Tape Threading Guide
Ring Roller shaft
Pinch Roller Assembly

Fig-1

6-33. LOADING RING ASSEMBLY REPLACEMENT

Mode : In the middle of threading

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

6-26
Cleaning Roller Assembly Removal
↓
6-23
FE Head Assembly/ Tape Cleaner Assembly Removal
↓
6-18
P. Guide Removal
↓
Loading Ring Assembly Replacement
↓
6-33-1
Position Adjustment of Adjustment Ring Roller/ Position Adjustment of Gear Box Assembly
↓
6-17-1
Pinch Press Assembly Position Adjustment
↓
7-3
Tape Path Check

Removal

1. Remove the Cleaning Roller Assembly. (Refer to section 6-27.)
2. Remove the FE Head Assembly/Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Loosen the two fixing screws of the Gear Box Assembly to disengage the gear from the Loading Ring. When disengaged, snugly tighten the two fixing screws.
5. Rotate the Loading Ring with finger until the Guide Roller on the Loading Ring comes in front of the MC sensor.
6. Rotate the Return Arm of the Tension Regulator Assembly in the direction A and lock the pin of the Return Arm on the hook **a**. (Refer to Fig-1.)
7. Loosen the adjusting screw of the Adjustment Ring Roller Assembly. Push the Ring Roller Mounting Plate in the direction G and snugly tighten the adjusting screw.
8. While pushing the Loading Ring Assembly in the direction of arrow **E**, remove the Loading Ring Assembly from the Ring Rollers C and D.

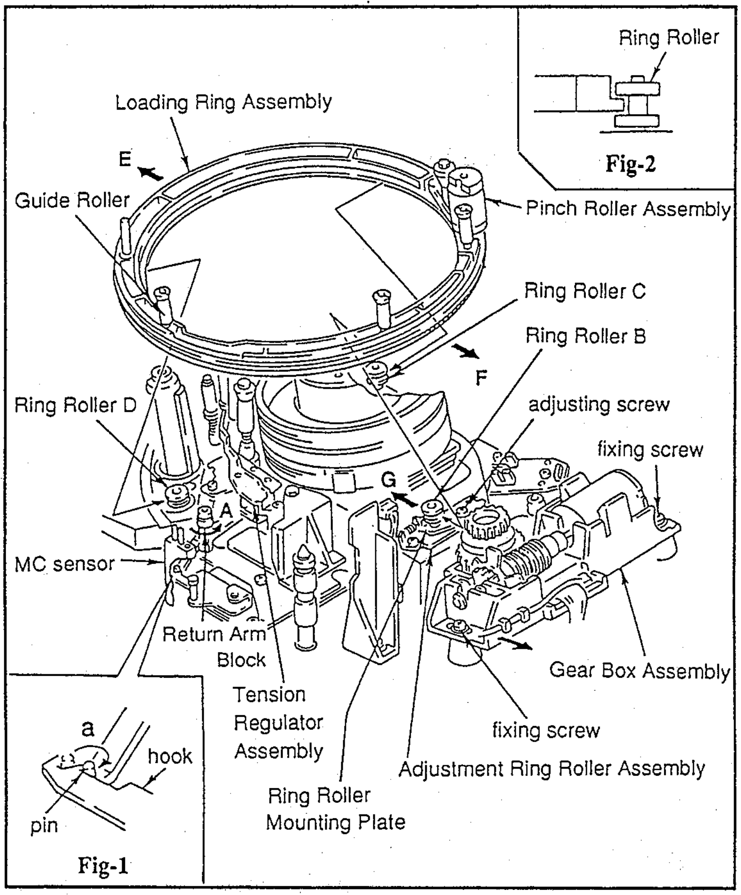
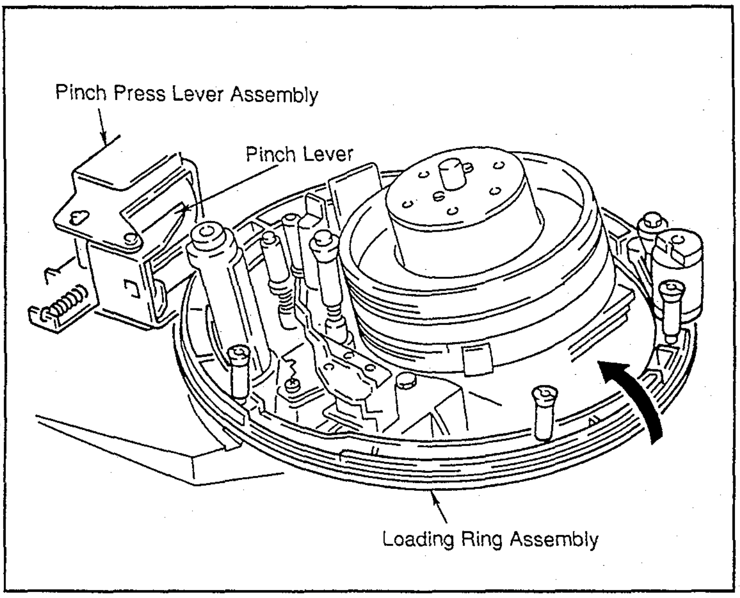

Ring Roller
Loading Ring Assembly
E
Guide Roller
Pinch Roller Assembly
Ring Roller C
Ring Roller B
F
adjusting screw
Ring Roller D
fixing screw
G
A
MC sensor
Return Arm Block
Gear Box Assembly
Tension Regulator Assembly
a
hook
fixing screw
Adjustment Ring Roller Assembly
Ring Roller Mounting Plate
pin

Fig-2

Fig-1

9. Slant the Loading Rign Assembly in the arrow direction as shown in order to escape the mechanism of the Pinch Press Lever, and remove the Loading Ring Assembly.

Precaution : Pay utmost attention not to injure the Drum Assembly, Head, Capstan shaft, Tape Guide shafts, etc.



Installation

10. Clean the three Ring Rollers with cleaning piece moistened with cleaning fluid.
11. Slant a new Loading Ring Assembly as shown, insert it under the Pinch Lever and install it.
12. Install the Loading Ring Assembly in the direction as shown into the Ring Rollers C and D.
13. While pushing the Loading Ring Assembly in the direction **F**, loosen the adjusting screw, and engage the Ring Roller with the Loading Ring Assembly. Tighten the adjusting screw with no play. (Refer to Fig-2.)
14. Rotate the Loading Ring Assembly in the clockwise direction with finger until it comes to the unthread end position.

Adjustment after replacement

15. Perform the Position Adjustment of the Adjustment Ring Roller, and Position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
16. Perform the P. Guide Installation. (Refer to section 6-18.)
17. Perform the FE Head Assembly/Tape Cleaner Assembly Installation. (Refer to section 6-23.)
18. Perform the Pinch Press Position Adjustment. (Refer to section 6-17-1.)
19. Perform the Tape Path Check. (Refer to section 7-3.)

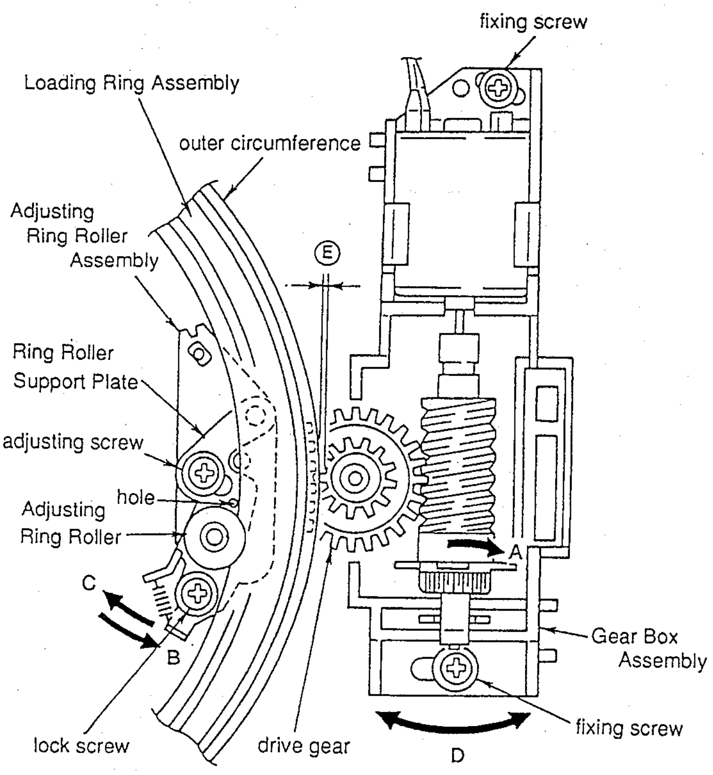
6-33-1. Position Adjustment of the Adjusting Ring Roller/Position Adjustment of the Gear Box Assembly

Tool :

Wire clearance check gauge: J-6152-450-A

Adjustment procedure

1. Rotate the worm gear of the Gear Box Assembly by one to two turns in the direction of Arrow **A** from the unthreaded end position.
2. Loosen the two fixing screws of the Gear Box Assembly to disengage the gear from the Loading Ring Assembly. Snugly tighten the screws.
3. Loosen the adjusting screw of the Ring Roller Support Plate by 1/4 to 1/2 turn.
4. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push it fully in the direction of Arrow **B** and tighten the screw.
5. Push the Adjusting Ring Roller fully to the Loading Ring Assembly and tighten the adjusting screw.
6. Move the Gear Box Assembly in the direction **D** until the clearance Ⓔ between the tooth bottom of the Drive Gear on the Gear Box Assembly and outer circumference of Loading Ring Assembly satisfies the specification. When satisfied, tighten the screws.
7. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push the Adjusting Ring Roller Assembly fully in the direction of arrow **C** and tighten the fixing screw.
8. Move the Loading Ring Assembly with finger and check that there is play.


fixing screw
Loading Ring Assembly
outer circumference
Adjusting Ring Roller Assembly
Ⓔ
Ring Roller Support Plate
adjusting screw
hole
Adjusting Ring Roller
A
C
B
Gear Box Assembly
fixing screw
lock screw
drive gear
D

Specification : Ⓔ= 0 to 0.1 mm

6-34. TENSION REGULATOR ARM UPPER FLANGE REPLACEMENT

Mode : Unthreading end mode

Tool :

L shaped wrench (acroww flat has 0.89 mm) : 7-700-736-06

Replacement flow chart

Tension Regulator Arm Upper Flange Replacement

7-2 ↓

Tape Path Alignement

7-6 ↓

CTL Head Height Check

7-7 ↓

CTL Head Position Check

Removal

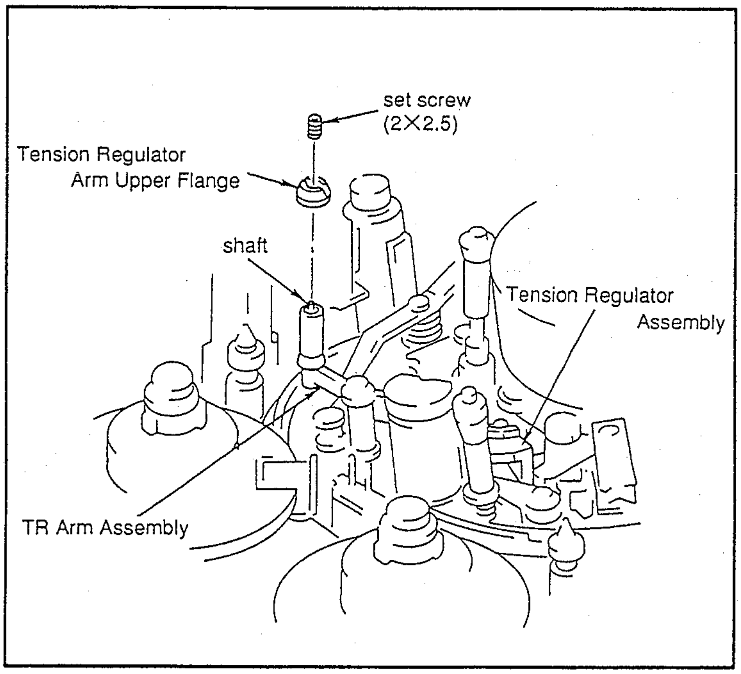
1. Loosen the set screw fixing the Tension Regulator Arm Upper Flange, and remove it.
2. Loosen the Tension Regulator Arm Upper Flange, and remove it.

Installation

3. Screw in the new Tension Regulator Arm Upper Flange into the shaft of the Tension Regulator Arm Assembly by 4 to 5 turns.
4. Install the set screw on the Tension Regulator Arm Upper Flange.

Adjustment after replacement

5. Perform the Tape Path Alignement. (Refer to section 7-2.)
6. Perform the CTL Head Height Check. (Refer to section 7-6.)
7. Perform the CTL Head Position Check. (Refer to section 7-7.)


set screw (2×2.5)
Tension Regulator Arm Upper Flange
shaft
Tension Regulator Assembly
TR Arm Assembly

6-35. TENSION REGULATOR ROLLER ASSEMBLY REPLACEMENT

Mode : Unthreading end mode

Tools :

L shaped wrench (across flat has 0.89 mm) : 7-700-736-06

Replacement flow chart

Tension Regulator Roller Assembly Replacement

↓ 7-2

Tape Path Alignement

↓ 7-6

CTL Head Height Check

↓ 7-7

CTL Head Position Check

Removal

1. Loosen the set screw from the TR Arm Assembly.
2. Loosen the Tension Regulator Arm Upper Flange, and remove the TR Roller Assembly.

Installation

3. Install the pressure spring and B Stay to the shaft of the TR Arm Assembly.
4. Install a new TR Roller Assembly in the TR Arm Assembly shaft in the direction shown in Fig-1.
5. Screw in the Tension Regulator Upper Flange into the TR Arm Assembly shaft 4 to 5 turns.
6. Install the set screw into the Tension Regulator Upper Flange.

Adjustment after replacement

7. Perform the Tape Path Alignment. (Refer to section 7-2.)
8. Perform the CTL Head Height Check. (Refer to section 7-6.)
9. Perform the CTL Head Position Check. (Refer to section 7-7.)

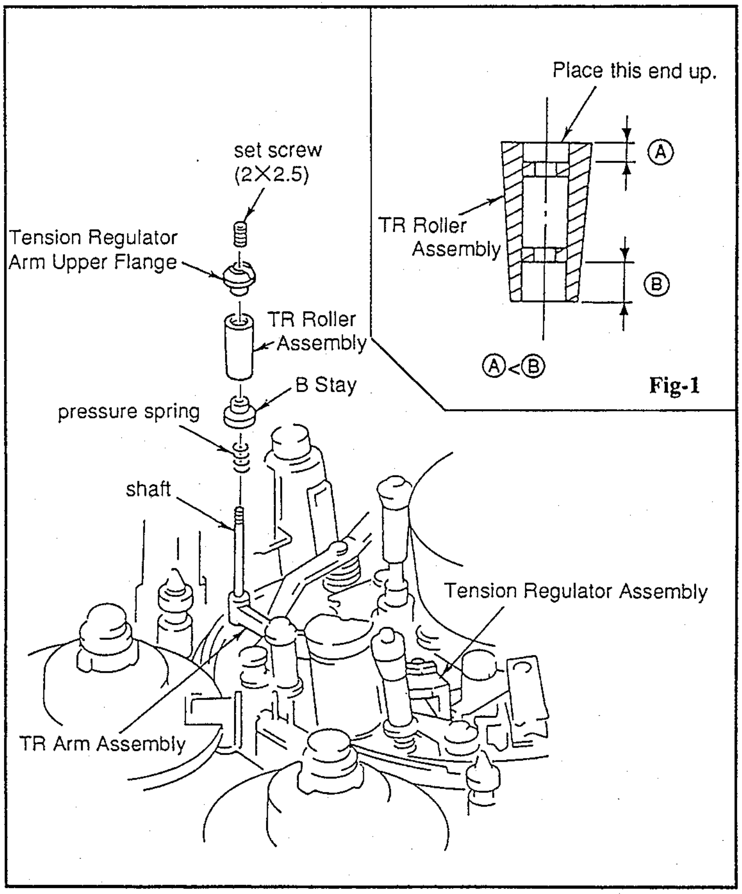

Place this end up.
Ⓐ
Ⓑ
TR Roller Assembly
Ⓐ<Ⓑ
set screw (2×2.5)
Tension Regulator Arm Upper Flange
TR Roller Assembly
B Stay
pressure spring
shaft
Tension Regulator Assembly
TR Arm Assembly

Fig-1

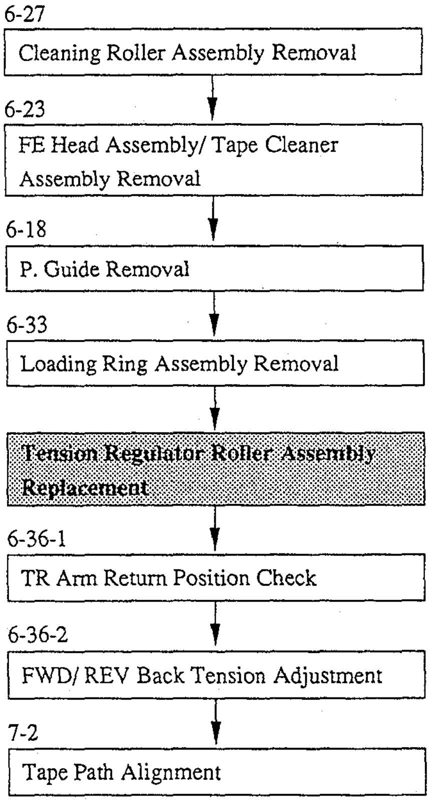
6-36. TENSION REGULATOR ASSEMBLY REPLACEMENT

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Cassette Reference Plate (L) : J-6320-880-A
Thickness gauge : J-6041-670-A

Replacement flow chart


6-27
Cleaning Roller Assembly Removal
6-23
FE Head Assembly/ Tape Cleaner Assembly Removal
6-18
P. Guide Removal
6-33
Loading Ring Assembly Removal
Tension Regulator Roller Assembly Replacement
6-36-1
TR Arm Return Position Check
6-36-2
FWD/ REV Back Tension Adjustment
7-2
Tape Path Alignment

Removal

1. Remove the Cleaning Roller Assembly.
   (Refer to section 6-27.)
2. Remove the FE Head Assembly/ Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Remove the Loading Ring Assembly.
   (Refer to section 6-33.)

Precaution : Rotate the Upper Drum with finger and stop at the position where video head will not contact the parts to remove.

5. Unplug the connector from TR-84 board.
6. Remove the two fixing screws of Tension Regulator Assembly and remove the it from chassis assembly.

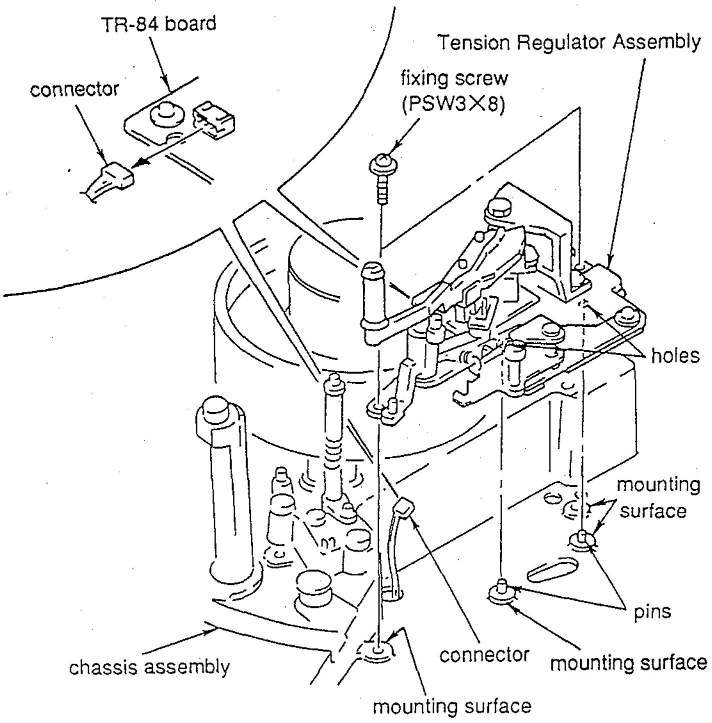
Precaution : Pay utmost attention not to injure tape contacting surface of the Upper Drum or guides etc.

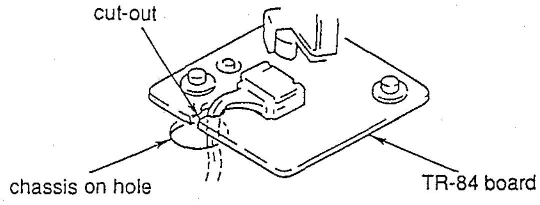
Installation

7. Clean the mounting surface of new Tension Regulator Assembly and chassis Assembly with Cleaning piece moistened with cleaning fluid.
8. Align the two holes of Tension Regulator Assembly with the two pins of the chassis Assembly. Assemble with two fixing screws.
9. Insert the connector to TR-84 board. Place the harness on the cut-out of TR-84 board. Remove slack of harness.
10. Install the new Tension Regulator Assembly by reversing the steps from 4 through 1.

Adjustment after replacement

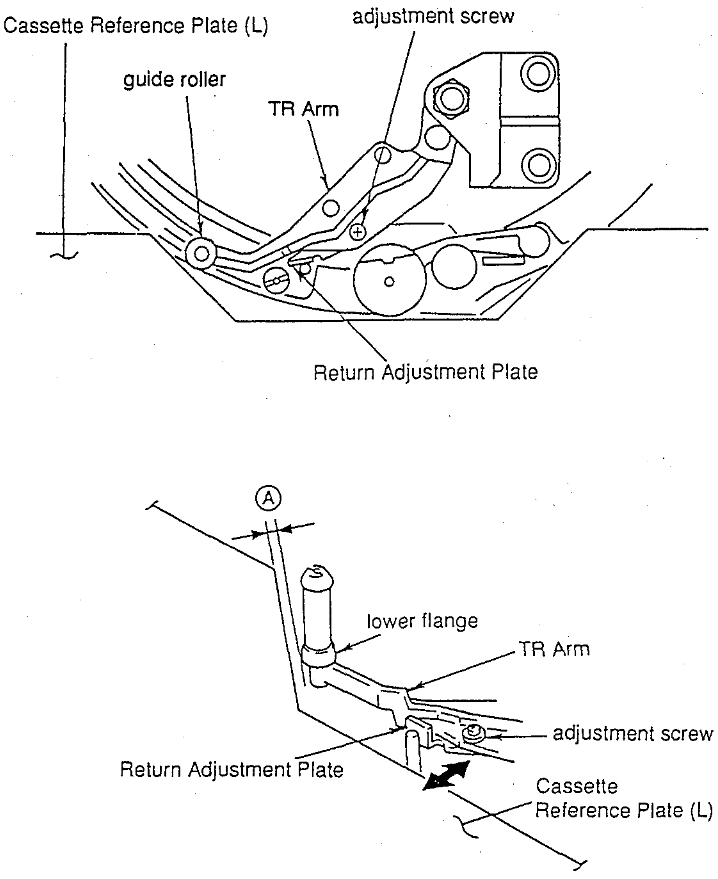
11. Perform the TR Arm Return Position Check
    (Refer to section 6-36-1.)
12. Perform the FWD/REV Back Tension Adjustment
    (Refer to section 6-36-2.)
13. Perform the Tape Path Alignment
    (Refer to section 7-2.)


TR-84 board
connector
Tension Regulator Assembly
fixing screw
(PSW3X8)
holes
mounting surface
pins
chassis assembly
connector
mounting surface
mounting surface


cut-out
chassis on hole
TR-84 board

6-36-1. TR Arm Return Position Adjustment

1. Turn on the power. Press STOP button to go through threading. Press EJECT button to go through unthreading and put the mechanism in the unthread end mode.
2. Place the Cassette Reference Plate.
3. Check that the clearance between the Cassette Reference Plate and the outer circumference of the lower flange of the TR Arm Guide Roller, satisfies the specification.
4. If the specification is not satisfied, loosen the adjustment screw, move the Return Adjustment Plate in the direction of arrow as shown until the specification is satisfied.
   Tighten the adjusting screw.


Cassette Reference Plate (L)
adjustment screw
guide roller
TR Arm
Return Adjustment Plate
Ⓐ
lower flange
TR Arm
adjustment screw
Return Adjustment Plate
Cassette
Reference Plate (L)

Specification : Ⓐ=1.9 ± 0.2 mm

6-36-2. FWD/REV Back Tension Adjustment

Mode : PLAY mode

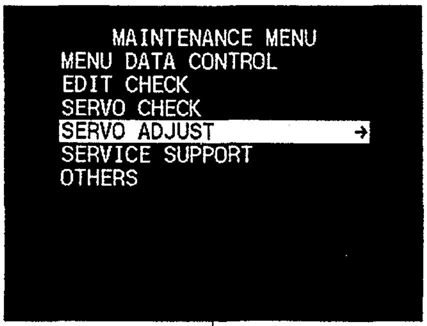
Tool :

Tension measurement tool (Tentelometer T2-H7 SLC)

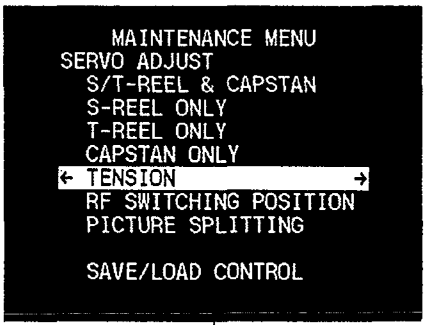
Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

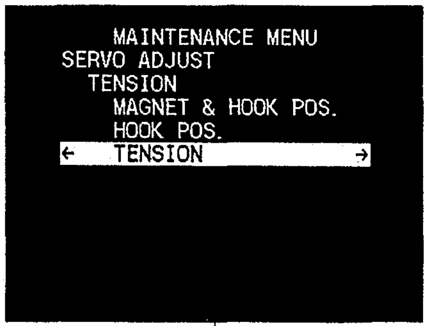
1. Install the Cassette Up Compartment.
2. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
3. Select "SERVO ADJUST" from the menu by Up/Down key.
4. Press the right key to display the following screen.


MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST →
SERVICE SUPPORT
OTHERS

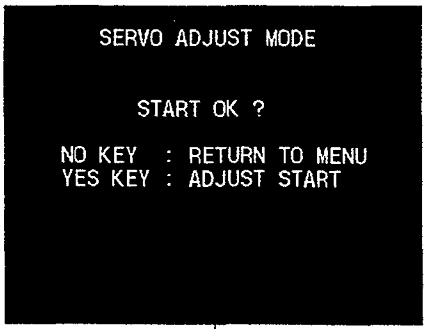
5. Select "TENSION" from the servo adjustment menu by Up/Down key.
6. Press the right key to display the following screen.


MAINTENANCE MENU
SERVO ADJUST
S/T-REEL & CAPSTAN
S-REEL ONLY
T-REEL ONLY
CAPSTAN ONLY
← TENSION →
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL

7. Select "TENSION" from the servo adjustment menu by Up/Down key.
8. Press the right key to display the following screen.

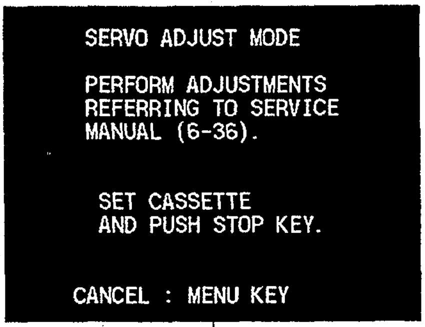

MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
HOOK POS.
← TENSION →

9. When preparation is ready, press YES key to start the adjustment.


SERVO ADJUST MODE
START OK ?
NO KEY : RETURN TO MENU
YES KEY : ADJUST START

Adjustment after replacement

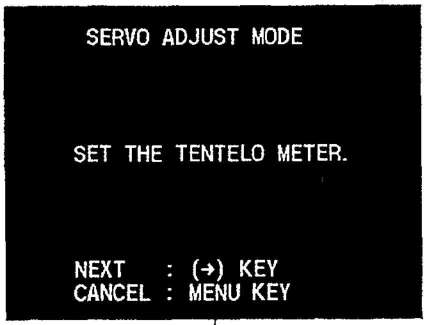
10. Thread a tape and press stop button.



```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-36).

 SET CASSETTE
 AND PUSH STOP KEY.

CANCEL : MENU KEY
```

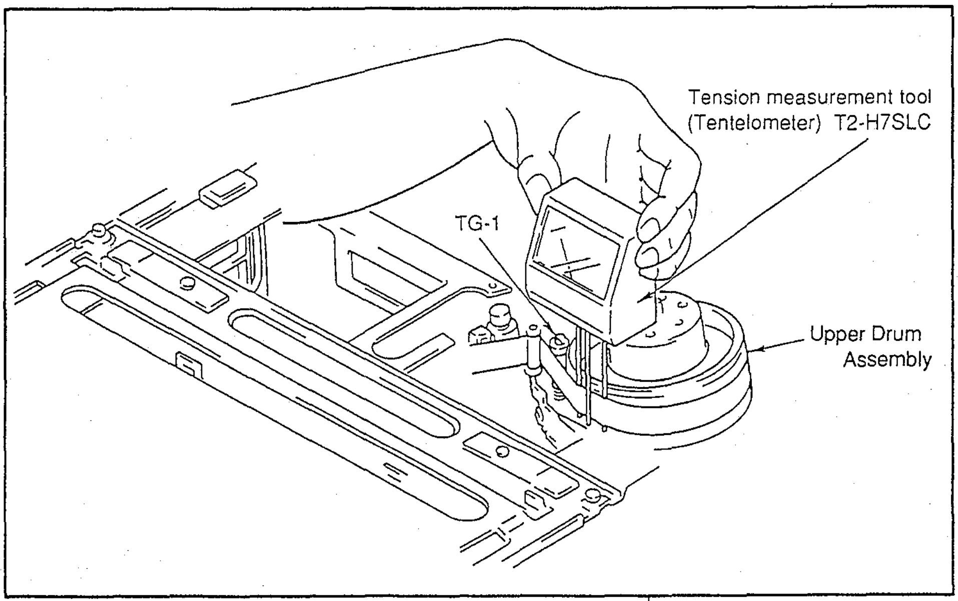
11. Hold the Tentelometer (tension measurement tool) with hand resting on the Cassette Up Compartment as shown. Insert it between the TG-1 and Upper Drum as shown.

Precaution : If the tension measurement tool happens to contact with the Upper Drum Assembly, it may give permanent damage to head tip and drum which will be unusable any more. Pay utmost attention not to contact.

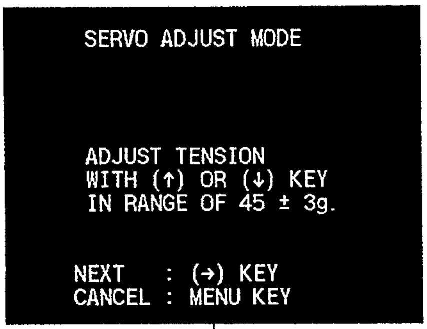


```
SERVO ADJUST MODE


SET THE TENTELO METER.


NEXT   : (→) KEY
CANCEL : MENU KEY
```

12. Press the right key to display the following screen. (Machine enters PLAY mode automatically)

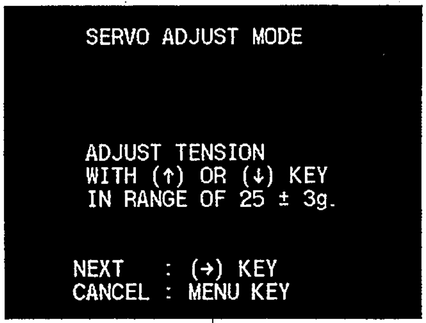


13. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates **45 ± 3 g**.
14. When the adjustment is complete, press the right key.



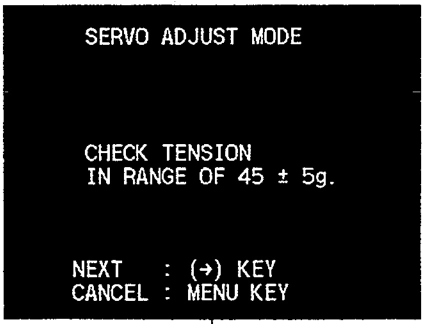
```
SERVO ADJUST MODE


ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF 45 ± 3g.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

15. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates **25 ± 3 g**.
16. When the adjustment is complete, press the right key.



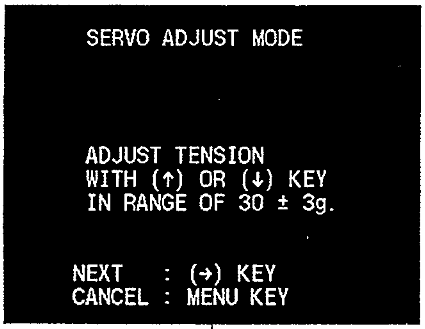
```
SERVO ADJUST MODE


ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF 25 ± 3g.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

17. Confirm that pointer of the tension measurement tool indicates **45 ± 5 g**.
18. Press the right key to display the following screen. (Machine enters REV mode automatically.)



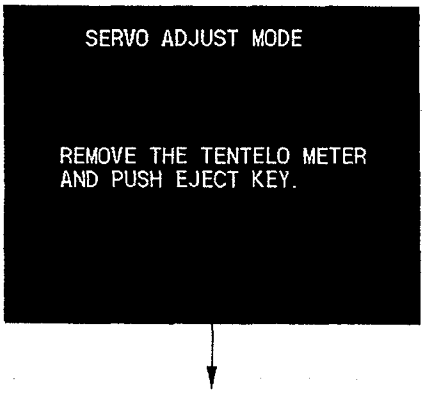
```
SERVO ADJUST MODE


CHECK TENSION
IN RANGE OF 45 ± 5g.


NEXT   : (→) KEY
CANCEL : MENU KEY
```

19. Keep pressing the Up/Down key so that the REV back tension becomes **30 ± 3 g**.
20. Press the right key to display the following screen.



```
SERVO ADJUST MODE


ADJUST TENSION
WITH (↑) OR (↓) KEY
IN RANGE OF 30 ± 3g.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

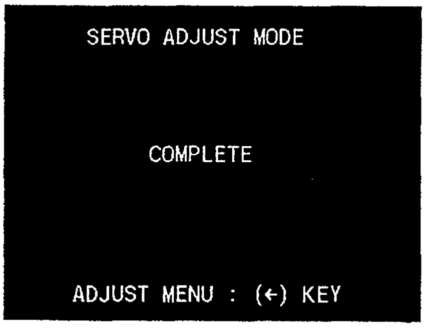
21. Remove the tension measurement tool paying utmost care not to contact with the drum.
22. Press the EJECT button to eject the cassette tape.



SERVO ADJUST MODE

REMOVE THE TENTELO METER
AND PUSH EJECT KEY.

23. Confirm that "COMPLETE" is displayed on monitor screen.



SERVO ADJUST MODE

COMPLETE

ADJUST MENU : (←) KEY

6-37. TENSION SENSOR AND DME REPLACEMENT

Replacement flow chart

TR Arm Assembly Removal

↓

DME Replacement

↓

TR Arm Assembly Installation

↓

6-36 Tension Regulator Assembly Installation

↓

6-36-1 TR Arm Return Position Check

↓

6-37-1 Tension Sensor Magnet Position Adjustment

↓

6-38-1 Tension Sensor Hook Position Adjustment

↓

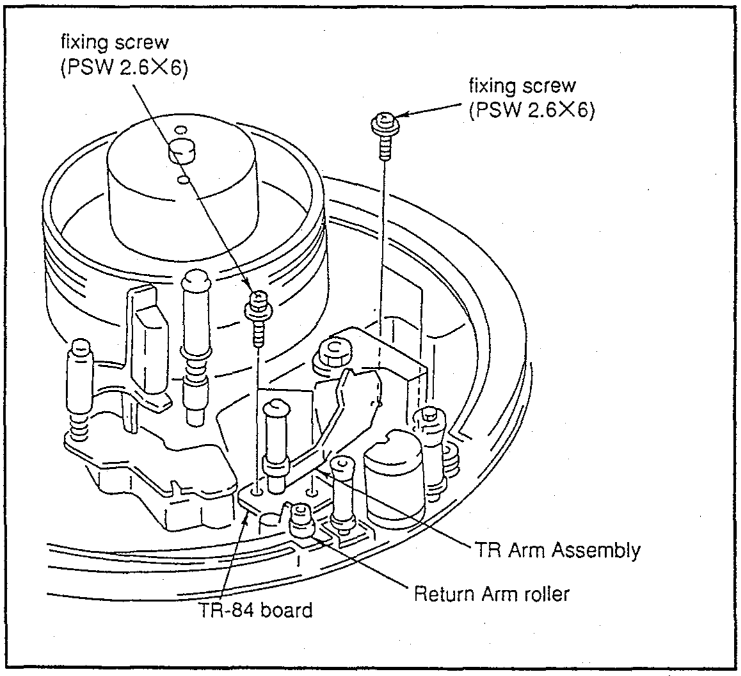
6-36-2 RWD/REW Back Tension Adjustment

↓

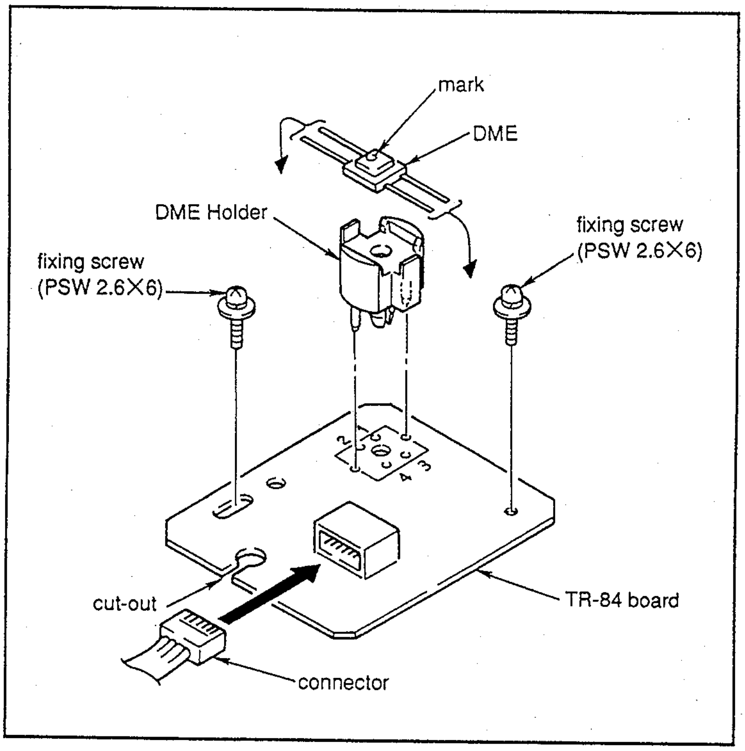
7-3 Tape Path Check

Removal

1. Rotate the worm of the Gear Box with finger until roller of the Return Arm comes to the position shown in the figure.
2. Remove the two screws holding the TR Arm Assembly. Remove the TR Arm Assembly.


fixing screw
(PSW 2.6×6)
fixing screw
(PSW 2.6×6)
TR Arm Assembly
Return Arm roller
TR-84 board

3. Unplug the connector from the TR-84 board.
4. Remove the two screws holding the TR-84 board. Remove the TR-84 board.
5. Unsolder the DME, and remove the DME and DME Holder from the TR-84 board.



Installation

6. Install a new DME into the DME Holder tightly without play. Bend legs of the DME.

Note : Align the ○ marked leg of the DME with the pin No.1 of TR-84 board.

7. Secure the new DME Holder into the TR-84 board tightly. Connect them by soldering.
8. Install the TR-84 board with two fixing screws.
9. Connect the harness to the TR-84 board connector. Place the harness to the cut-out of the TR-84 and remove slack of harness.
10. Install the TR Arm Assembly with two fixing screws.
11. Install the Tension Regulator Assembly with two fixing screws. (Refer to section 6-36.)
12. Perform the TR Arm Return Position Check. (Refer to section 6-36-1.)
13. Perform the Tension Sensor Magnet Position Adjustment. (Refer to section 6-37-1.)
14. Perform the Tension Sensor Hook Position Adjustment. (Refer to section 6-38-1.)
15. Perform the RWD/REV Back Tension Adjustment. (Refer to section 6-36-2.)
16. Perform the Tape Path Check. (Refer to section 7-3.)

6-37-1. Tension Sensor Magnet Position Adjustment

Mode : Threading end mode

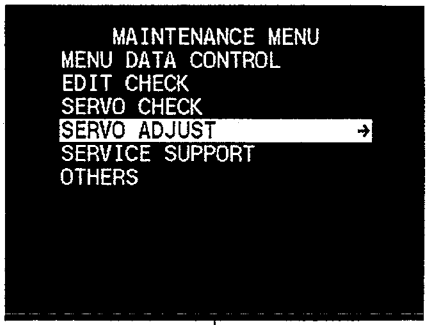
Tools :

TR Arm Position Ajustment Tool Parallelism pin 3×12
: 3-703-360-09
Eccentric screw driver : 3-702-390-02
or
Flat head 3 mm screw driver : 7-700-750-01

Preparation :

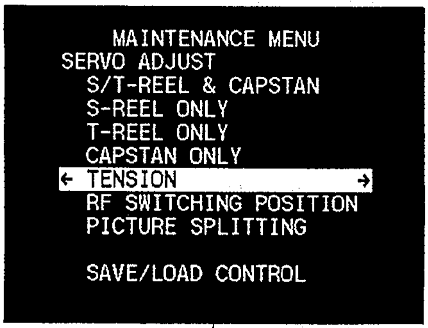
Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.



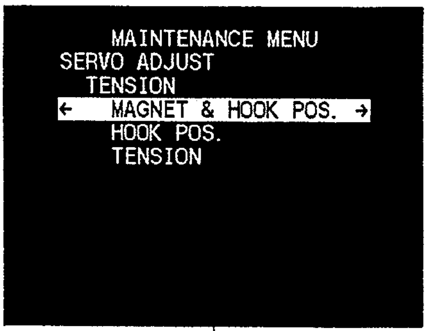
```
    MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST              →
SERVICE SUPPORT
OTHERS
```

6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.



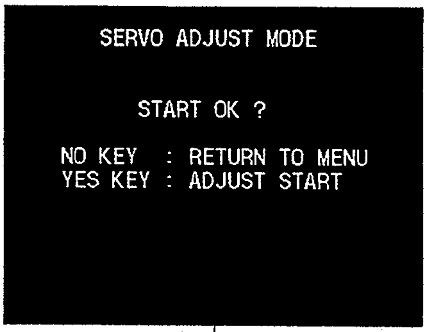
```
    MAINTENANCE MENU
SERVO ADJUST
  S/T-REEL & CAPSTAN
  S-REEL ONLY
  T-REEL ONLY
  CAPSTAN ONLY
← TENSION                 →
  RF SWITCHING POSITION
  PICTURE SPLITTING

  SAVE/LOAD CONTROL
```

8. Select "MAGNET & HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.

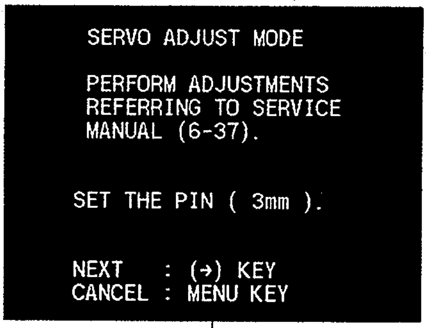


```
    MAINTENANCE MENU
SERVO ADJUST
  TENSION
←   MAGNET & HOOK POS.    →
    HOOK POS.
    TENSION
```

10. When preparation is ready, press YES key to start the adjustment.



```
SERVO ADJUST MODE

START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```



```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-37).

SET THE PIN ( 3mm ).

NEXT   : (→) KEY
CANCEL : MENU KEY
```

Adjustment after replacement

11. Wrap a 5 mm width vinyl tape 1 to 2 turns around the Parallelism Pin at the position of 10 mm from its end. (Refer to Fig-1)
12. Loosen the two fixing screws 1/2 to 1 turn holding the CTL Head Assembly.
13. Insert a flat (head) screw driver tip into the cut-out of the CTL Head Mounting Plate. Adjust the position so that the hole of the CTL Head Mounting Plate and the hole of the chassis are aligned.
14. Insert Parallelism Pin setting the TR Arm Position passing through the hole of the CTL Head Mounting Plate and the hole of the chassis.

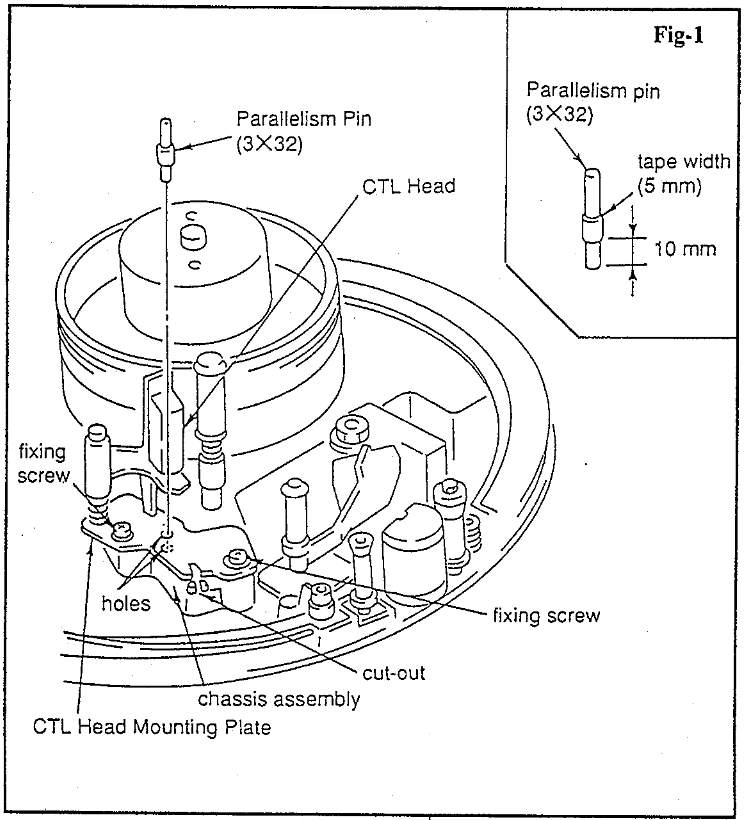


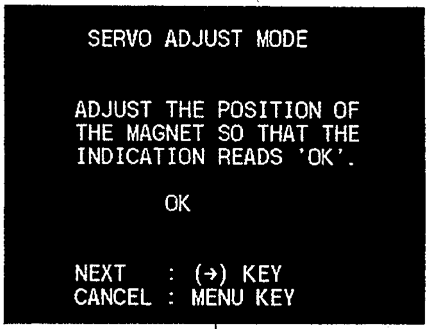
Fig-1

Parallelism pin
(3X32)
tape width
(5 mm)
10 mm
Parallelism Pin
(3X32)
CTL Head
fixing
screw
holes
fixing screw
cut-out
chassis assembly
CTL Head Mounting Plate

15. Press the right key to display the following screen.
16. Loosen the adjustment screw of the TR Arm Assembly.
17. Insert a flat (head) screw driver tip into the square hole of the TR Arm Assembly. Adjust the position by rotating the magnet so that the HIGH/LOW is changed to "OK" on the monitor display.

Note 1 : Magnet position is very delicate. Adjust with enough attention.

Note 2 : Pay utmost attention not to contact the tools with drum.

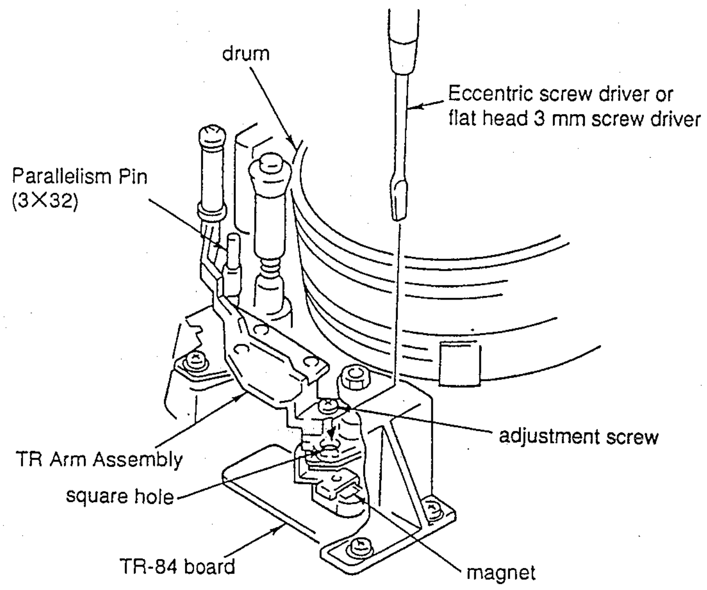


SERVO ADJUST MODE

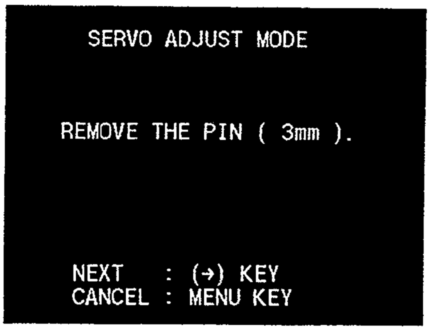
ADJUST THE POSITION OF
THE MAGNET SO THAT THE
INDICATION READS 'OK'.

OK

NEXT : (→) KEY
CANCEL : MENU KEY


drum
Eccentric screw driver or flat head 3 mm screw driver
Parallelism Pin (3X32)
adjustment screw
TR Arm Assembly
square hole
TR-84 board
magnet

18. Press the right key to display the following screen.
19. Remove the Parallelism Pin.
20. Press the right key to display the following screen.
21. Perform the Tension Sensor Hook Position Adjustment. (Refer to 6-38-1.)



SERVO ADJUST MODE

REMOVE THE PIN (3mm).

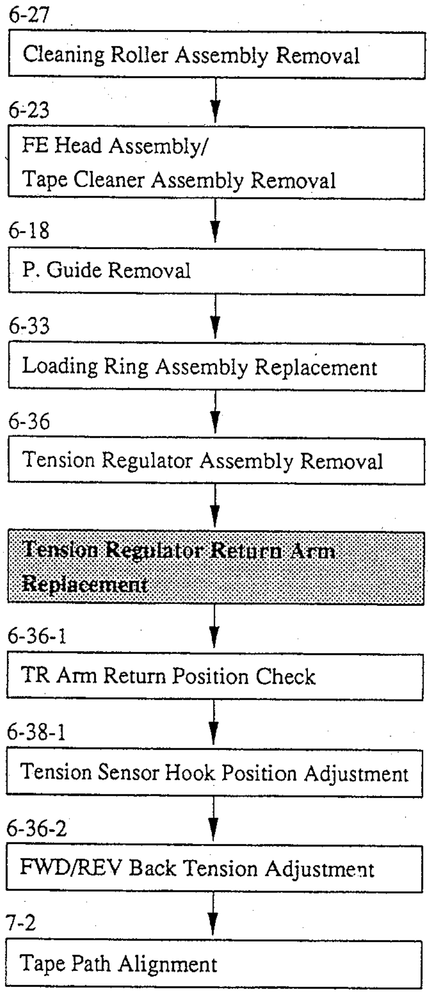
NEXT : (→) KEY
CANCEL : MENU KEY

6-38. TENSION REGULATOR RETURN ARM REPLACEMENT

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-662-010-04

Replacement flow chart


6-27
Cleaning Roller Assembly Removal
6-23
FE Head Assembly/
Tape Cleaner Assembly Removal
6-18
P. Guide Removal
6-33
Loading Ring Assembly Replacement
6-36
Tension Regulator Assembly Removal
Tension Regulator Return Arm
Replacement
6-36-1
TR Arm Return Position Check
6-38-1
Tension Sensor Hook Position Adjustment
6-36-2
FWD/REV Back Tension Adjustment
7-2
Tape Path Alignment

Removal

1. Remove the Cleaning Roller Assembly. (Refer to section 6-27.)
2. Remove the FE Head Assembly/Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Remove the Loading Ring Assembly. (Refer to section 6-33.)
5. Remove the Tension Regulator Assembly. (Refer to section 6-36.)
6. Remove the tension coil spring hooked on the Return Arm.
7. Remove the two fixing screws from the TR Arm Assembly. Remove the leaf spring and protector together.
8. Remove the E-ring 2.3 from the shaft of Tension Regulator Assembly. Remove the Return Arm.

Installation

9. Clean the shaft of the Tension Regulator Assembly with cleaning piece moistened with cleaning fluid. Apply a drop oil on the shaft surface.
10. Install a new Return Arm into the shaft and secure it with E-ring 2.3.
11. Assemble the leaf spring and protector as shown. Install them to the TR Arm Assembly while the Return Arm Pin enters the square hole of the protector, as shown. Secure them with two screws.

Precaution : When securing them, do not apply force to the pivot of the TR Arm Assembly.

12. Hook the tension coil spring on the Return Arm.
13. Coat grease thin on the protector, leaf spring and Arm. (Refer to Fig-1, Fig-2)
14. Install the Tension Regulator Assembly. (Refer to section 6-36.)

Adjustment after replacement

15. Perform the TR Arm Return Position Check. (Refer to section 6-36-1.)
16. Perform the Tension Sensor Hook Position Adjustment. (Refer to section 6-38-1.)
17. Perform the FWD/REV Back Tension Adjustment. (Refer to section 6-36-2.)
18. Perform the Tape Path Alignment. (Refer to section 7-2.)

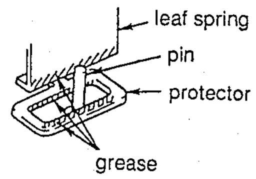

leaf spring
pin
protector
grease

Fig-1

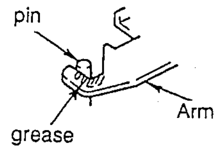
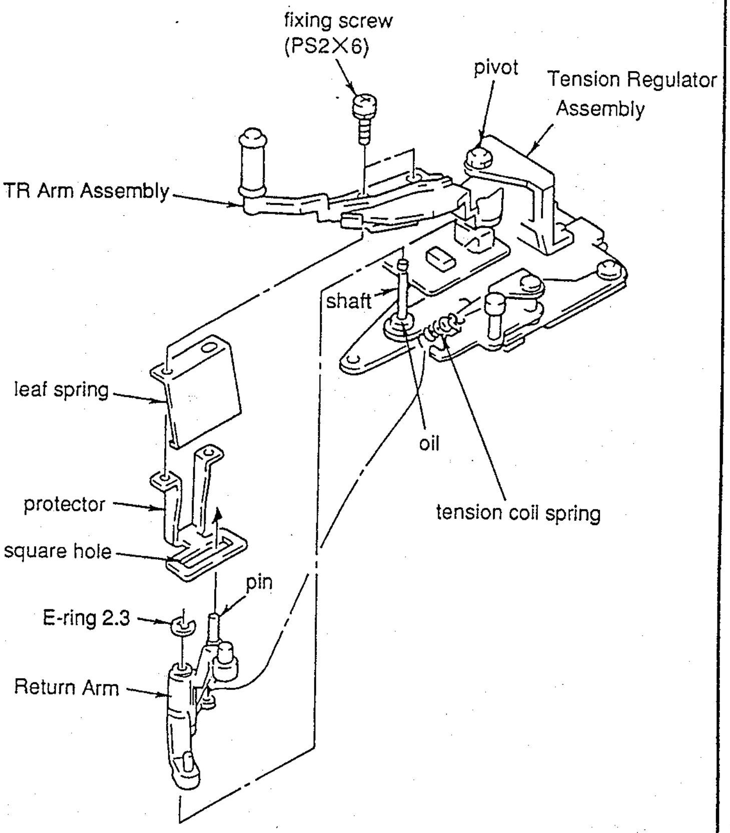

pin
Arm
grease

Fig-2


fixing screw
(PS2X6)
pivot
Tension Regulator
Assembly
TR Arm Assembly
shaft
leaf spring
oil
protector
tension coil spring
square hole
pin
E-ring 2.3
Return Arm

Tension Regulator Return Arm Assembly

6-38-1. *Tension Sensor Hook Position Adjustment.*

Mode : Threading end mode

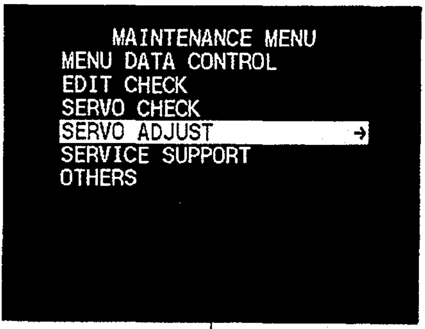
Tool : Tension Sensor Adjustment Tape Tool
(Refer to section 6-1.)
(Hook Position Adjustment Tape Tool)

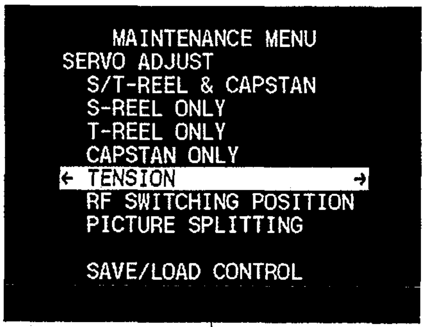
Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

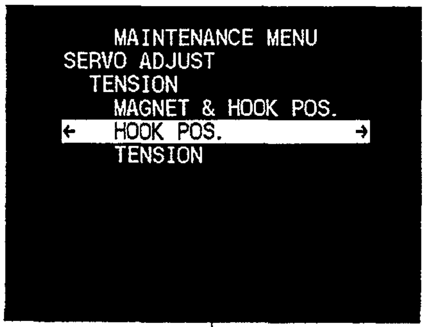
Replacement flow chart

1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.
6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.

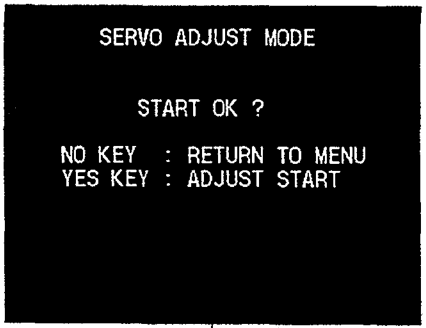

MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST →
SERVICE SUPPORT
OTHERS


MAINTENANCE MENU
SERVO ADJUST
S/T-REEL & CAPSTAN
S-REEL ONLY
T-REEL ONLY
CAPSTAN ONLY
← TENSION →
RF SWITCHING POSITION
PICTURE SPLITTING
SAVE/LOAD CONTROL

8. Select "HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.

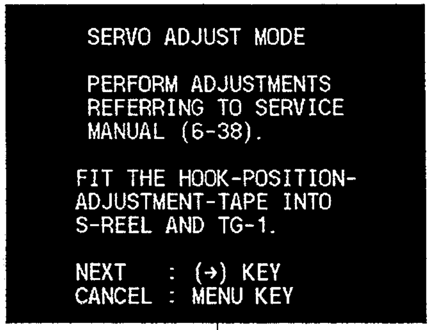

MAINTENANCE MENU
SERVO ADJUST
TENSION
MAGNET & HOOK POS.
← HOOK POS. →
TENSION

10. When preparation is ready, press YES key to start the adjustment.


SERVO ADJUST MODE

START OK ?

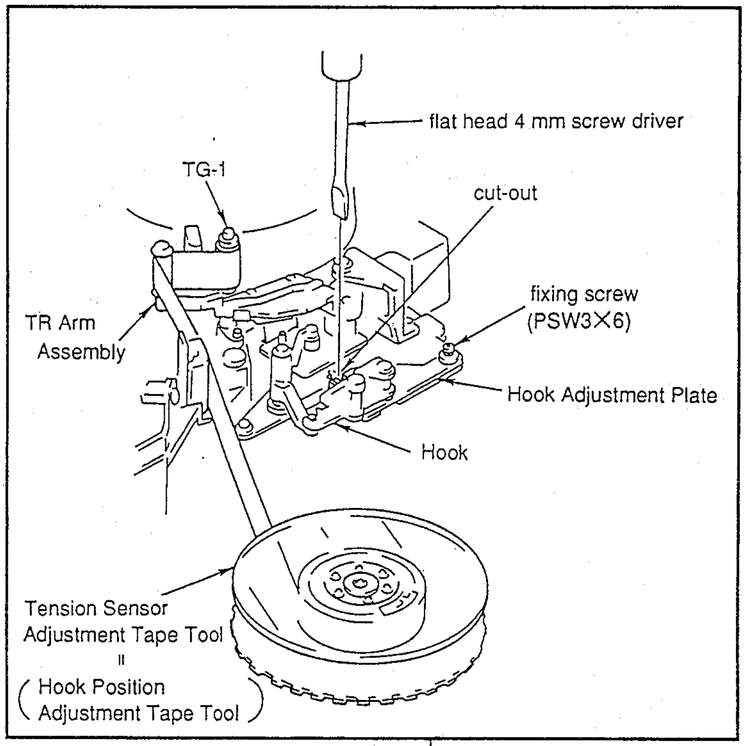
NO KEY : RETURN TO MENU
YES KEY : ADJUST START



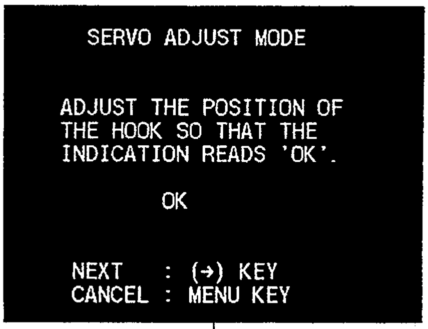
```
SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-38).

FIT THE HOOK-POSITION-
ADJUSTMENT-TAPE INTO
S-REEL AND TG-1.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

Adjustment after replacement

11. Place the Tension Sensor Adjustment Tape Tool on the supply reel as shown. Hook its top loop on TG-1.
    Thread the tape in the normal tape path as shown.

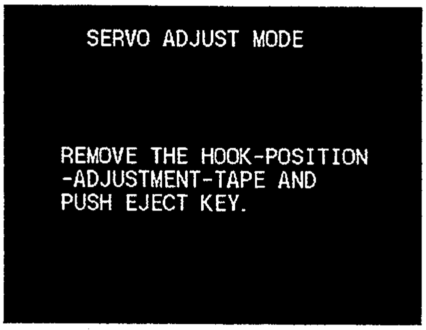

flat head 4 mm screw driver
TG-1
cut-out
fixing screw
(PSW3×6)
TR Arm
Assembly
Hook Adjustment Plate
Hook
Tension Sensor
Adjustment Tape Tool
॥
(Hook Position
Adjustment Tape Tool)

12. Press the right key to display the following screen.
13. Loosen slightly the fixing screw of the Hook Adjustment Plate.
14. Insert a flat head screw driver tip into the cut-out of the Hook Adjustment Plate so that the HIGH/LOW is changed to "OK" on the monitor display.
15. Press the right button to display the following screen.



```
SERVO ADJUST MODE


ADJUST THE POSITION OF
THE HOOK SO THAT THE
INDICATION READS 'OK'.

        OK


NEXT   : (→) KEY
CANCEL : MENU KEY
```

16. Remove the Tension Sensor Adjustment Tape Tool.
17. Press the EJECT button.
18. Set the switches on SS-61 board S201-1 and -4 to off. (Refer to section 6-1.)



SERVO ADJUST MODE

REMOVE THE HOOK-POSITION
-ADJUSTMENT-TAPE AND
PUSH EJECT KEY.

SECTION 7
TAPE PATH ALIGNMENT

7-1. GENERAL INFORMATION FOR TAPE PATH ADJUSTMENT

1. ALIGNMENT TAPE

The following alignment tapes are used in the tape path adjustment

CR2-1B PS : 8-960-096-51
CR5-1B PS : 8-960-096-91
CR8-1B PS : 8-960-096-86
CR8-1A PS : 8-960-098-45

2. TAPE GUIDE ADJUSTMENT SCREW DRIVER

: J-6321-500-A

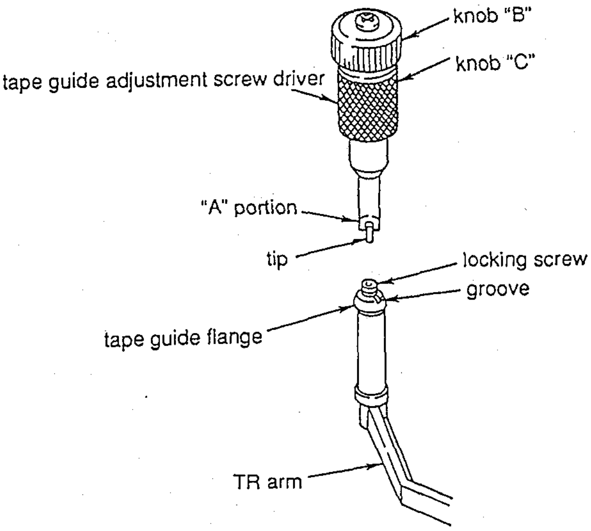
This tape guide adjustment screw driver is used to rotate the upper flange of the TR arm guide roller during tape path (entrance side) alignment. Operating procedure of this tape guide adjustment screw driver is described below.

(1) Align the "A" portion with the groove of tape guide.

(2) Hold the knob "C" and rotate the knob "B" which loosens the locking screw.

(3) Align the knob "B" tip with the hole of the tape guide locking screw.
Hold the knob "B" and rotate the knob "C" which rotates the upper flange of the tape guide.

(4) To tighten the locking screw of the tape guide flange, hold the knob "C" and rotate the knob "B" which tightens the locking screw.
Tightening torque : 0.1 to 0.12 N · m
(1.0 to 1.2 kgf · cm)



3. OTHER TAPE GUIDE ADJUSTMENT SCREW DRIVER

Use the box driver with 4.5 mm diagonal size

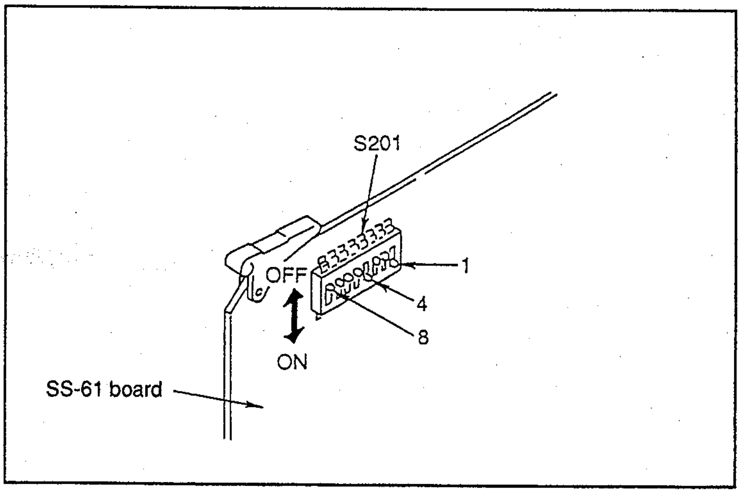
4. USE OF CASSETTE COMPARTMENT

Attach the cassette compartment during the tape path alignment. It enables more accurate adjustments.

5. USE OF VIDEO TRACKING CONTROL

(1) The Video Tracking Control potentiometer is not equipped in this unit. The video tracking can be changed by setting the SS-61 board switch S201-1 to on and pressing the Left key or Right key on the Sub Control Panel.
(The S201 switches are all set to off when shipped from factory.)

(2) When the RESET (NO) button is pressed, the video tracking is reset to the tracking center position.
When the power is turned off, the video tracking is reset to the tracking center position.

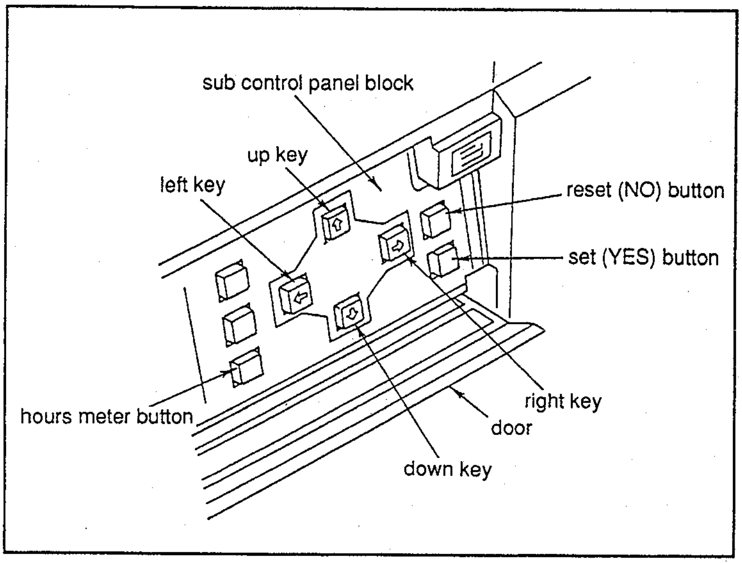

S201
OFF
1
4
8
ON
SS-61 board

6. TAPE PATH ALIGNMENT PREPARATION

(1) Set the SS-61 board switch S201-1 to on.

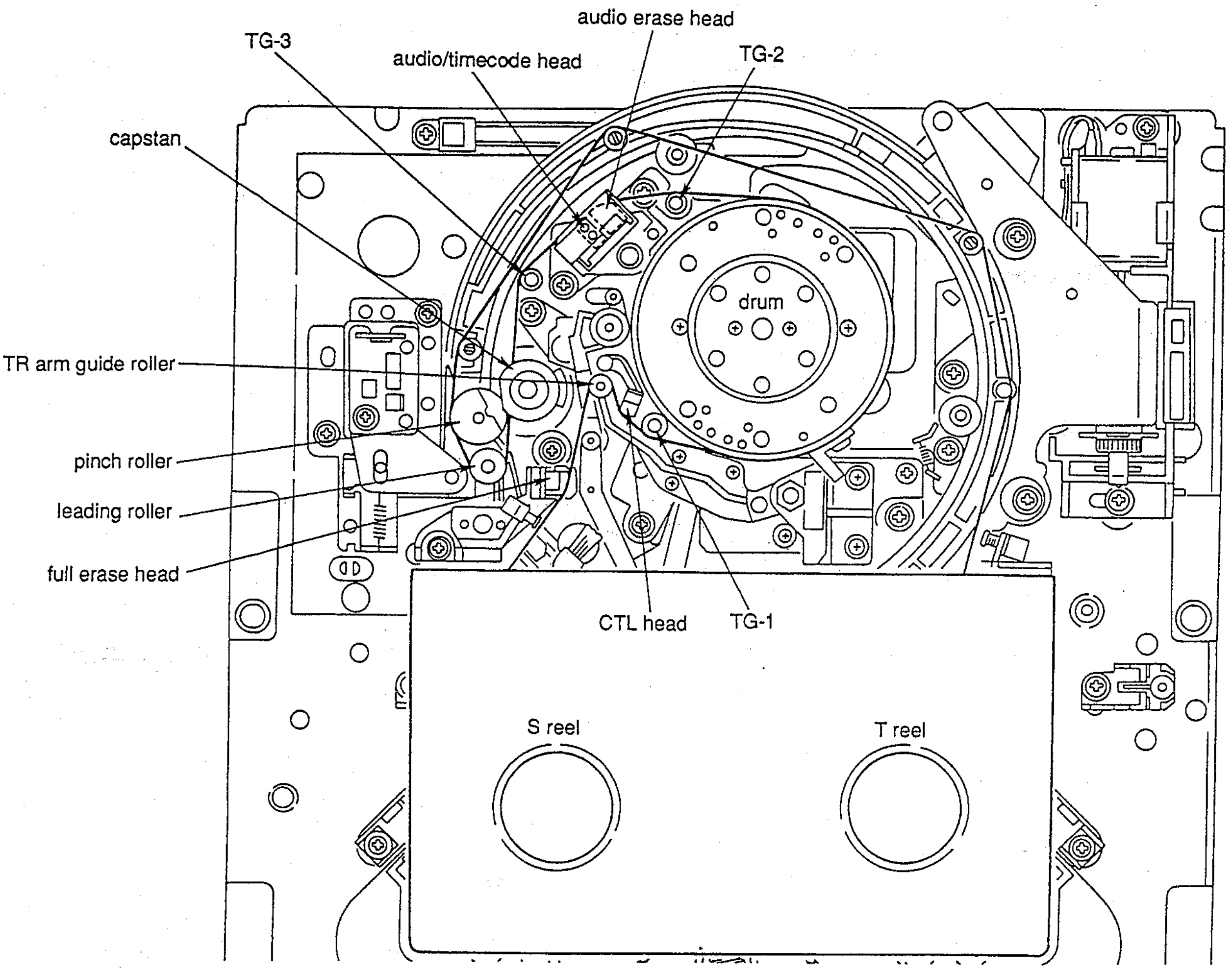
(2) Clean the tape contacting surface of tape guides, drum, video head, etc., with cleaning piece soaked with cleaning fluid.

(3) REV mode cannot be established with this unit alone. Use a remote control unit (SVRM-100/100A) or controller (RM-450/PVE-500 and others) to establish REV mode.

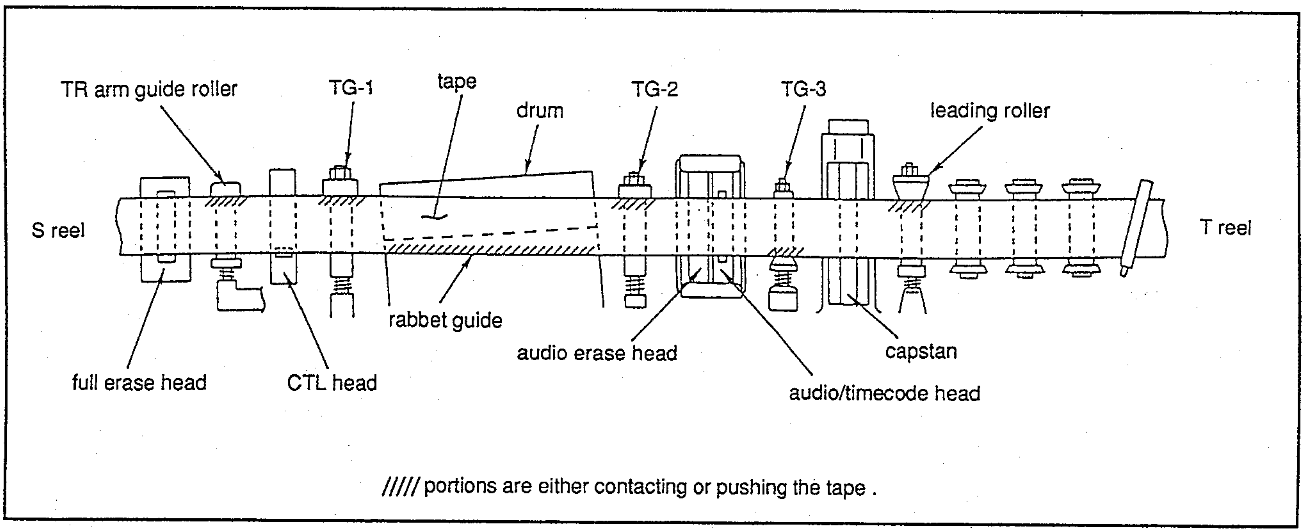

sub control panel block
up key
left key
reset (NO) button
set (YES) button
hours meter button
right key
door
down key

7. LOCATION OF HEADS AND TAPE GUIDES

Location of heads and tape guides referred to in the alignment procedure is shown below.


audio erase head
TG-3
audio/timecode head
TG-2
capstan
TR arm guide roller
drum
pinch roller
leading roller
full erase head
CTL head
TG-1
S reel
T reel

8. TAPE PATH DIAGRAM


TR arm guide roller
TG-1
tape
drum
TG-2
TG-3
leading roller
S reel
T reel
rabbet guide
audio erase head
capstan
full erase head
CTL head
audio/timecode head

///// portions are either contacting or pushing the tape .

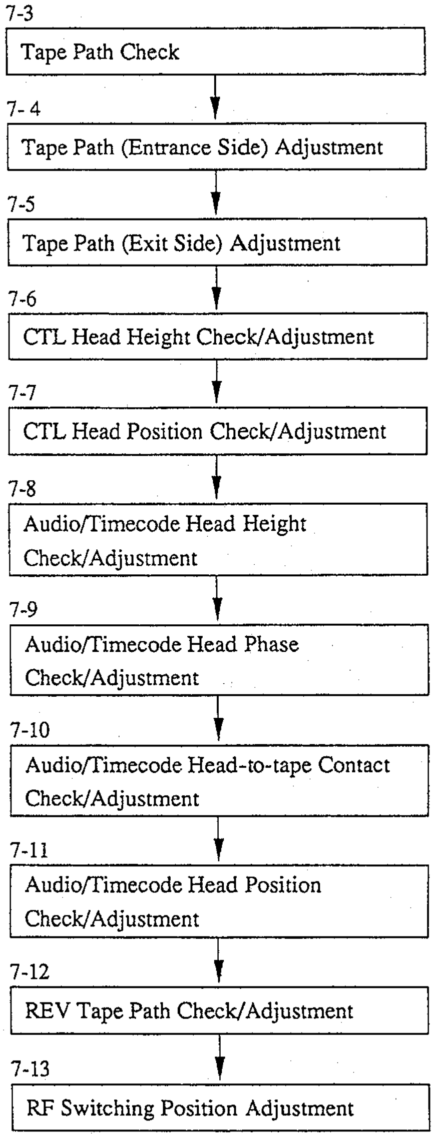
9. LIST OF MEASUREMENT POINTS/SIGNALS FOR ADJUSTMENT

SIGNAL NAME	BOARD NAME	TP TERMINAL (ADDRESS)	MARKING ON BOARD
VIDEO RF Y-Ach	VP-44	TP101 (L-2)	YA
VIDEO RF Ych	VP-44	TP103 (L-1)	Y RF
VIDEO RF C ch	VP-44	TP301 (H-1)	C RF
SWICHING PULSE Ych	VP-44	TP102 (P-1)	Y SW
GND	VP-44	E102 (N-1)	GND
CTL SIGNAL	SS-61	TP225 (C-1)	CTL SIG
CTL PULSE	SS-61	TP203 (D-1)	CTL PULSE
GND	SS-61	E201 (D-1)	GND
AUDIO OUT CH-1	AP-31	TP5 (G-1)	DLVL 1
GND	AP-31	E2 (G-1)	GND
AUDIO OUT CH-2	AP-31	TP205 (D-1)	DLVL 2
GND	AP-31	E202 (E-1)	GND
TIME CODE	AP-31	TP403 (D-1)	LTC EQ

7-2. TAPE PATH ALIGNMENT

The tape path alignment is very important adjustment to run a tape in the optimum conditions.
If this alignment is incorrect, tape may be injured.
Pay utmost attention when performing this adjustment.
Attach the cassette compartment when performing the tape path alignment.
It enables more accurate adjustments.

Adjustment flow chart


7-3
Tape Path Check
7-4
Tape Path (Entrance Side) Adjustment
7-5
Tape Path (Exit Side) Adjustment
7-6
CTL Head Height Check/Adjustment
7-7
CTL Head Position Check/Adjustment
7-8
Audio/Timecode Head Height Check/Adjustment
7-9
Audio/Timecode Head Phase Check/Adjustment
7-10
Audio/Timecode Head-to-tape Contact Check/Adjustment
7-11
Audio/Timecode Head Position Check/Adjustment
7-12
REV Tape Path Check/Adjustment
7-13
RF Switching Position Adjustment

Caution : When any one of the adjustments is performed, check all the subsequent items in the order of flow chart.

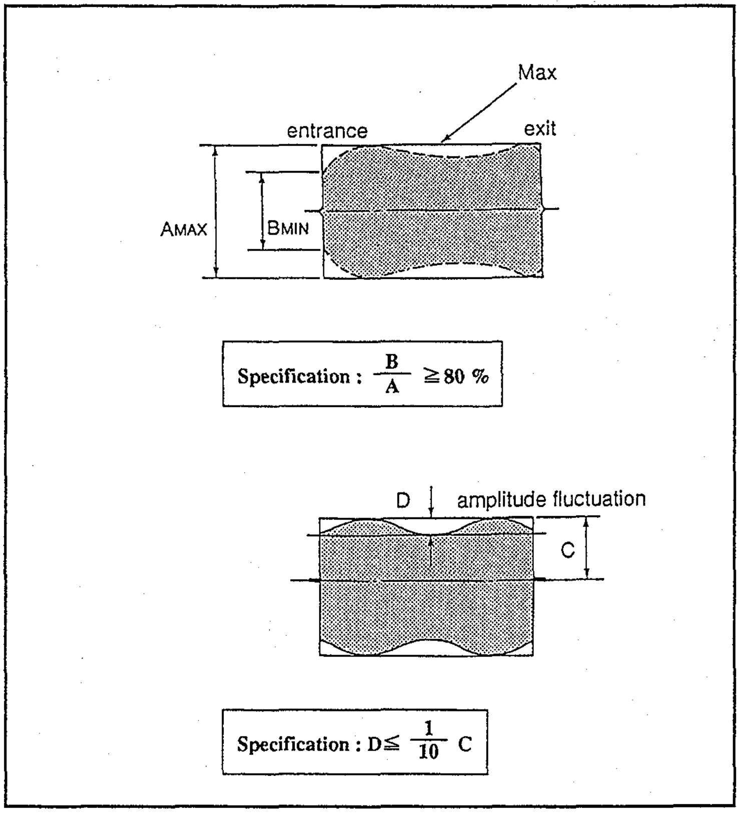
7-3. TAPE PATH CHECK

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Alignment tape CR2-1B PS	: 8-960-096-51
Adjustment inspection mirror	: J-6080-029-A
Dual trace oscilloscope	

Check procedure

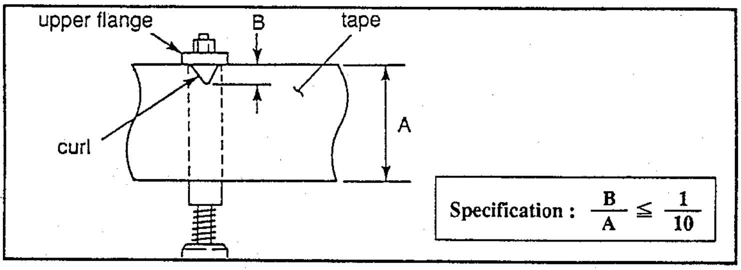
1. Connect an oscilloscope.
   CH-1 : TP101/VP-44 board (L-2)
   CH-2 : TP102/VP-44 board (P-1)
   TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. Press the Left or Right key on the sub control panel for the maximum RF envelope.
4. This envelope must satisfy the specifications of BMIN versus AMAX amplitude ratio.
5. Amplitude fluctuation of this RF envelope must satisfy the specifications at entrance, center and exit.



Specification : $\frac{B}{A} \geqq 80\ \%$

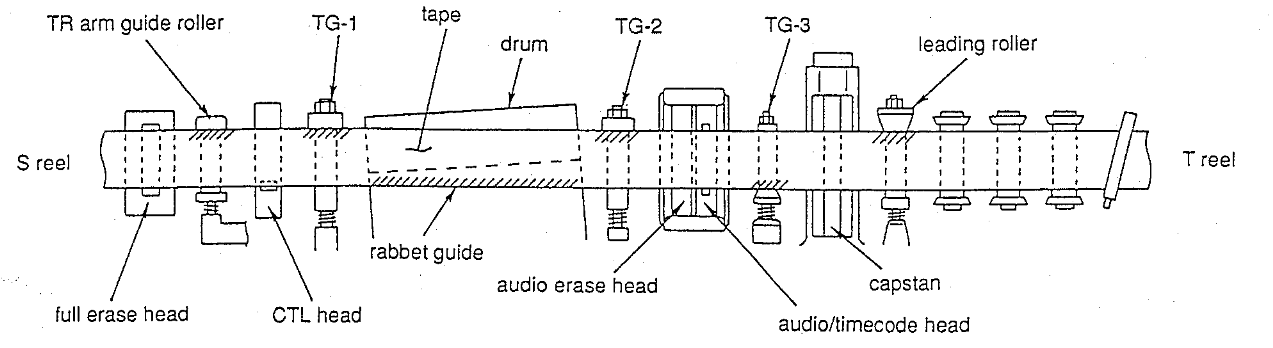
Specification : $D \leqq \frac{1}{10}\ C$

6. The RF envelope must satisfy the specifications of steps 4 and 5, and at the same time must satisfy the tape curl specifications at each guide.
   - Tape curl specifications
   (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide must be less than 1/10 of tape width.
   (2) Tape curl must not exist at drum rabbet guide (entrance and exit) and TG-3.


upper flange
B
tape
curl
A

Specification : $\frac{B}{A} \leq \frac{1}{10}$

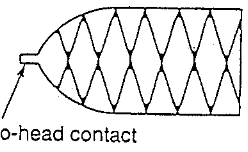
Tape path condition


TR arm guide roller
TG-1
tape
drum
TG-2
TG-3
leading roller
S reel
T reel
rabbet guide
audio erase head
capstan
full erase head
CTL head
audio/timecode head

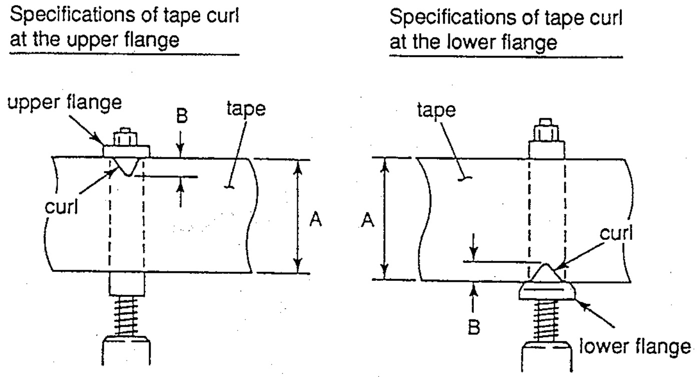
///// portions are either contacting or pushing the tape

Specification : Any partial loss of tape-to-head contact must not occur.

7. The RF envelope must not have any partial loss of tape-to-head contact in FF and REW modes.


loss of tape-to-head contact

8. Tape path in FF and REW modes must satisfy the following tape path specifications at each guide.
   - Tape curl specifications.
   (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide roller must be less than 1/10 of tape width. That at the lower flange of TG-3 must meet this specifications too.
   (2) Tape curl must not exist at drum rabbet guide (entrance and exit).
9. If the tape path does not satisfy the specifications from steps 4 through 8, perform the section "7-4. Tape Path (Entrance Side) Adjustment" and "7-5. Tape Path (Exit Side) Adjustment".


Specifications of tape curl at the upper flange
Specifications of tape curl at the lower flange
upper flange
B
tape
curl
A
A
tape
curl
B
lower flange

Specification : $\frac{B}{A} \leq \frac{1}{10}$

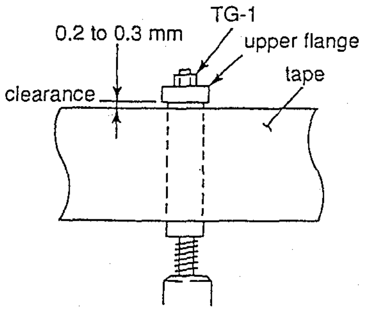
7-4. TAPE PATH (ENTRANCE SIDE) ADJUSTMENT

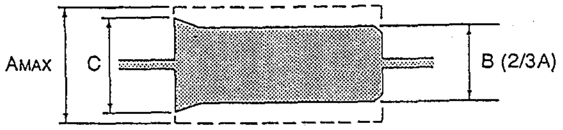
Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Alignment tape CR2-1B PS : 8-960-096-51
Tape guide adjustment screw driver : J-6321-500-A
Adjustment inspection mirror : J-6080-029-A
Dual trace oscilloscope
Box driver (diagonal length 4.5 mm)

Adjustment procedure

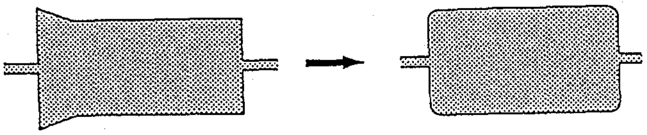
1. Connect an oscilloscope.
   CH-1 : TP101/VP-44 board (L-2)
   CH-2 : TP102/VP-44 board (P-1)
   TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. While running a tape in play mode, loosen the TG-1 nut so that a clearance is generated between TG-1 upper flange and tape.
4. Press the Left key on the sub control panel so that RF signal amplitude is decreased to 2/3.
5. Loosen the screw fixing the TR arm guide roller upper flange. Adjust height of the upper flange until the specifications is satisfied. After adjustment, tighten the fixing screw.
6. Adjust height of TG-1 using the nut until the RF envelope is flat.
7. The tape curl at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.
8. Establish REV × 1 tape speed. The tape curl at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.





Specification : B<C<1.05B

Make the RF envelope flat.



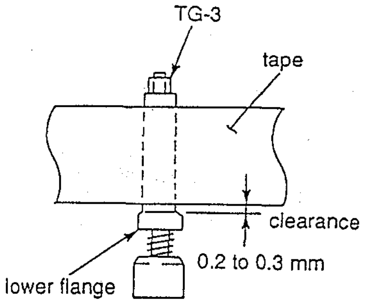
7-5. TAPE PATH (EXIT SIDE) ADJUSTMENT

Tools :

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Alignment tape CR2-1B PS : 8-960-096-51
Adjustment inspection mirror : J-6080-029-A
Dual trace oscilloscope
Box driver (diagonal length 4.5 mm)
–2 mm screw driver

Adjustment procedure

1. Connect an oscilloscope.
   CH-1 : TP101/VP-44 board (L-2)
   CH-2 : TP102/VP-44 board (P-1)
   TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. While running the tape in play mode, loosen the TG-3 nut so that a clearance is generated between TG-3 lower flange and tape.
4. Press the Left and Right key on the sub control panel for the maximum RF envelope.
5. Loosen the TG-2 nut so that a clearance is generated between TG-2 upper flange and tape.
6. The RF envelope must satisfy the specifications shown. (Refer to Fig-1.)


TG-3
tape
clearance
0.2 to 0.3 mm
lower flange

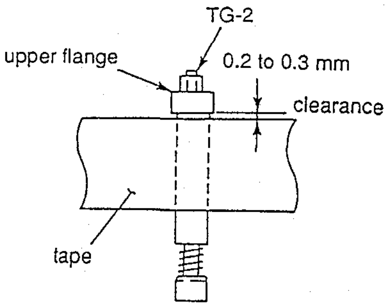
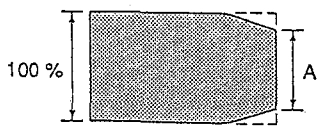
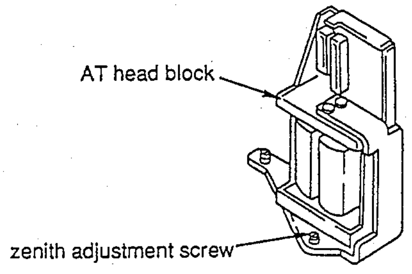

TG-2
upper flange
0.2 to 0.3 mm
clearance
tape

Fig-1.



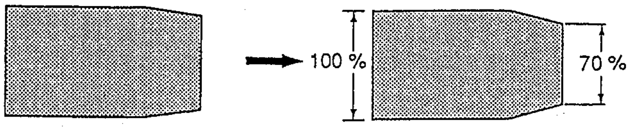
Specification : A=30 to 70 %

7. If the specifications A in step 6 is not satisfied, adjust the zenith adjustment screw of the AT head.



   (1) If the specifications A is 30 % or low, turn the zenith adjustment screw of the AT head counter-clockwise as shown.

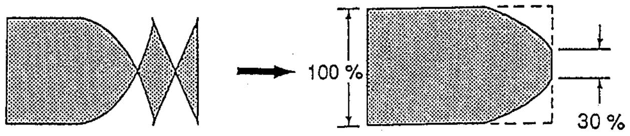
Adjustment when A is 30 % or less. Turn the zenith adjustment screw counter-clockwise.



This waveform is called as 30 %.

   (2) If the specifications A is 70 % or more, turn the zenith adjustment screw of the AT head clockwise as shown.

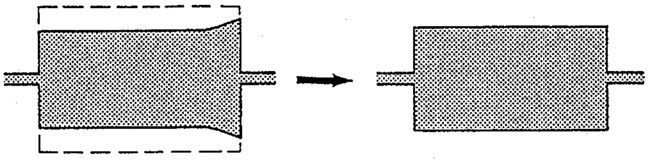
Adjustment when A is 70 % or more. Turn the zenith adjustment screw clockwise.



This waveform is called as 70 %.

8. (1) While the tape top is contacting with the TG-2 upper flange, adjust the TG-2 nut so that the RF signal amplitude becomes 2/3 of the maximum amplitude.
   (2) Adjust for the flat RF envelope at exit.
9. Loosen and adjust the TG-3 nut to remove and not to make clearance between tape bottom edge and TG-3 lower flange.
10. The amount of tape curl in the play mode must satisfy the conditions below.
    (1) Amount tape curl at the TG-2 upper flange must be less than 1/10 of tape width.
    (2) There must exist no tape curl at TG-3 lower flange.

Make the RF envelope flat.



7-6. CTL HEAD HEIGHT CHECK/ADJUSTMENT

Tools :

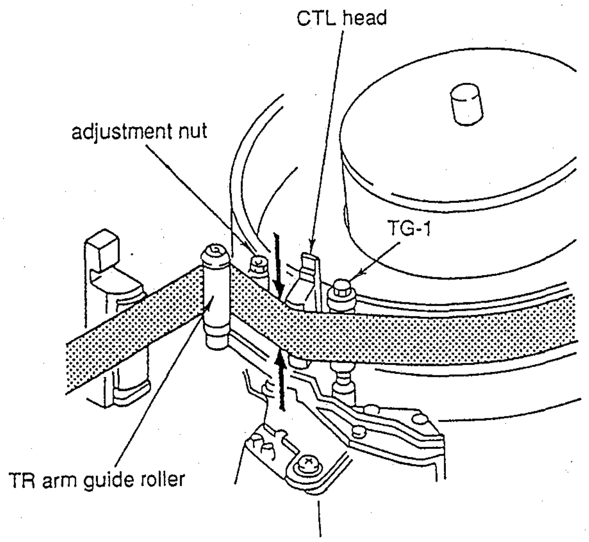
Alignment tape CR8-1A PS : 8-960-098-45
Dual trace oscilloscope
Box driver (diagonal length 4.5 mm)

Check procedure

1. Connect an oscilloscope.
   CH-1 : TP225/SS-61 board (C-1)
2. Set the switches on SS-61 board S201-1 and -5 to on.
3. Playback the 1 kHz recorded segment 1 kHz, 0 VU (8:00 to 10:00) on the CTL track of the alignment tape CR8-1A PS.
4. Press the tape (between the CTL head and TR arm guide roller) as shown with finger, and check that the RF signal level decreases.

Adjustment procedure

5. In the case that the signal level increases when the tape is pushed up, turn the adjustment nut as shown in clockwise for the maximum output.
6. In the case that the signal level increases when the tape is pressed down, turn the adjustment nut as shown in counter-clockwise for the maximum output.
7. Set the switches on SS-61 board S201-1 and -5 to off.



7-7. CTL HEAD POSITION CHECK/ADJUSTMENT

Tools :

Alignment tape CR2-1B PS : 8-960-096-51
Dual trace oscilloscope
Box driver (diagonal length 4.5 mm)
–3 mm screw driver

Check procedure

1. Connect an oscilloscope.
   CH-1 : TP101/VP-44 board (L-2)
   CH-2 : TP102/VP-44 board (P-1)
   TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. Running the tape in play mode, press the RESET button on the sub control panel to set the video tracking in the center position.
4. Press the Left and Right keys on the sub control panel which shift the video tracking. Check that the RF signal amplitude decreases when the video tracking of off tracking. (Refer to Fig-1.)
5. Press the RESET (NO) button on the sub control panel. Check that the center of the RF envelope has the maximum amplitude. (Refer to Fig-2.)
6. If the requirements in steps 4 and 5 are not satisfied, perform the next adjustment.

Adjustment procedure

7. Loosen the two screws fixing the CTL head ass'y about 1/2 turn. Insert –3 mm screw driver tip into the cut-out of the base. Move the CTL head in the direction shown by arrow to obtain the maximum amplitude at the center of the RF envelope.
   (Refer to Fig-3.)

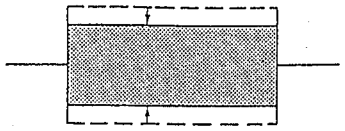


Fig-1.

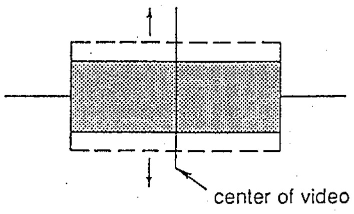


Fig-2.

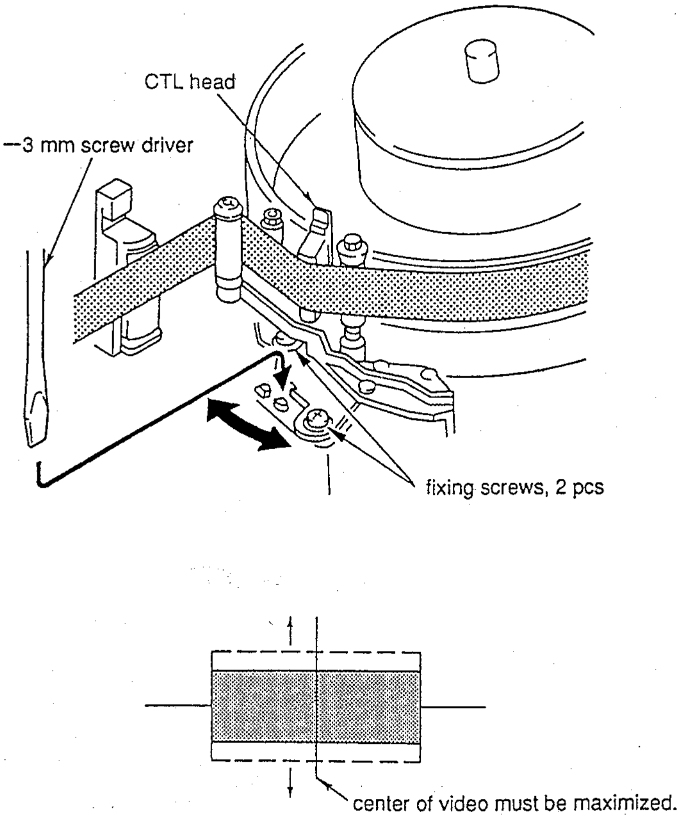


Fig-3.

7-8. AUDIO/TIMECODE HEAD HEIGHT CHECK/ADJUSTMENT

Tools :

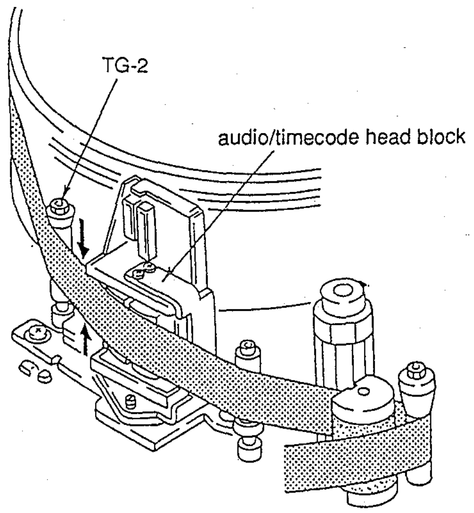
Alignment tape CR8-1A PS : 8-960-098-45
Dual trace oscilloscope
Box driver (diagonal length 4.5 mm)

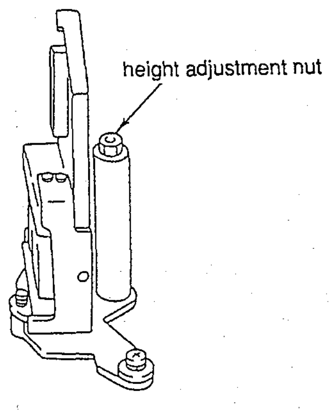
Check procedure

1. Connect an oscilloscope.
   CH-1 : TP5/AP-31 board (G-1)
   CH-2 : TP205/AP-31 board (D-1)
2. Set the switches on SS-61 board S201-1 and -5 to on.
3. Playback the 1 kHz, 0 VU (8:00 to 10:00) segment which is the last segment of the alignment tape CR8-1A PS.
4. Press down the portion of the tape as shown (between audio/timecode head and TG-2 tape guide), or push up and check that audio level decreases in both cases.
   If the level does not decrease, perform the following adjustment.

Adjustment procedure

5. Adjust the height adjustment nut using the boxing driver for the maximum level of both CH-1 and CH-2.
   After completing the adjustment, be sure to perform the following check/adjustment items.
6. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
7. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.
   (Refer to section 7-10.)
8. Perform the Audio / Timecode Head Position Check /Adjustment. (Refer to section 7-11.)
9. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
10. Set the switches on SS-61 board S201-1 and -5 to off.





7-9. AUDIO/TIMECODE HEAD PHASE CHECK/ADJUSTMENT

Preparation

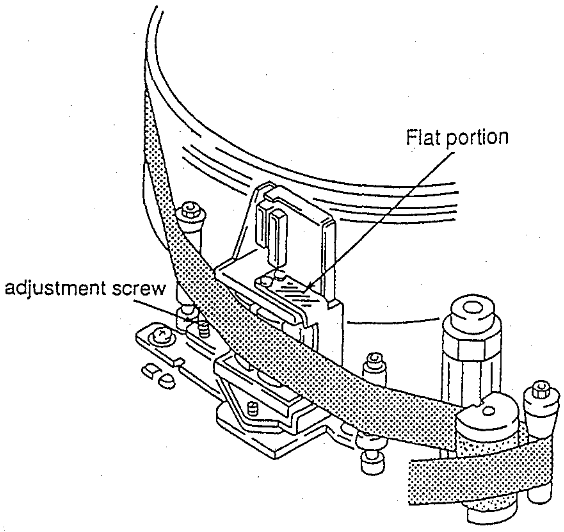
Set switch S201-2 (DOLBY switch) on SS-61 board to ON. (Refer to section 6-1.)

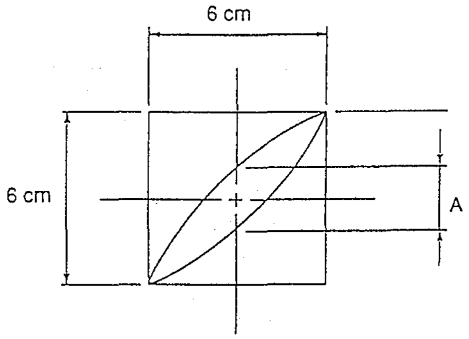
Tools :

Alignment tape CR8-1B PS : 8-960-096-86
Dual trace oscilloscope
–2 mm screw driver

Check procedure

1. Connect an oscilloscope.
   CH-1 : TP5/AP-31 board (G-1)
   CH-2 : TP205/AP-31 board (D-1)
2. Playback the audio 10 kHz, –10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Obtain the Lissajous waveform on the oscilloscope. Set the vertical and horizontal amplitudes to 6 mm respectively.
4. The vertical amplitude at the center of horizontal direction must satisfy the specifications.

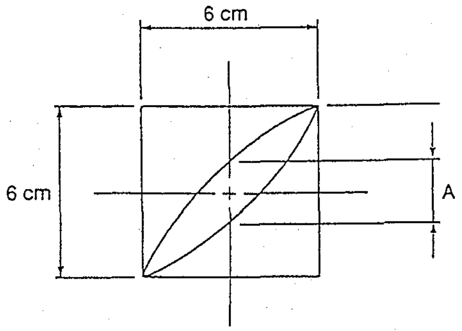




Specification 1 : A≦2 cm

Adjustment procedure

5. If the specifications is not satisfied, turn the adjustment screw shown to satisfy the specification 1.
   After completing this adjustment, be sure to perform the following items.
6. Tap then the flat portion of the head with screw driver tip as shown. Check that the phase specification 2 is satisfied
7. Perform the Audio / Timecode Head Height Check/Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.
   (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



Specification 2 : A≦4.2 cm

7-10. AUDIO/TIMECODE HEAD-TO-TAPE CONTACT CHECK/ADJUSTMENT

Tools :

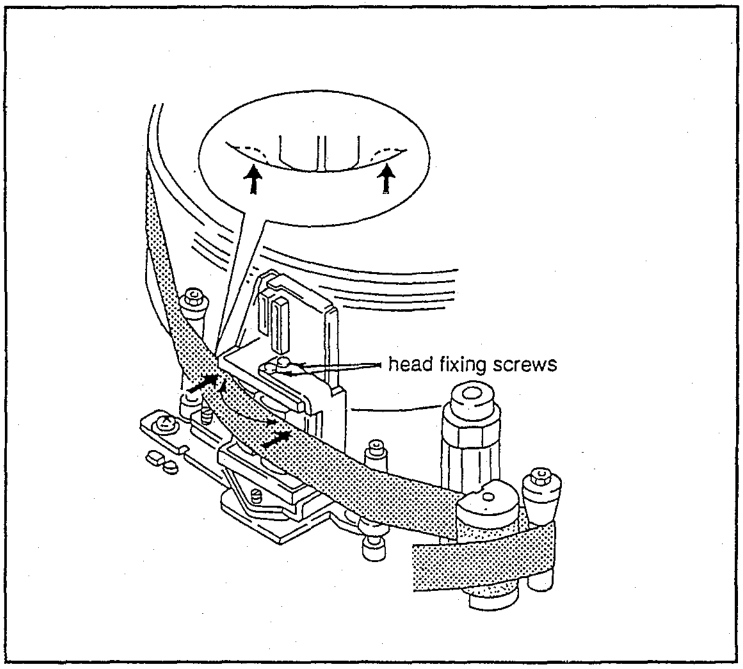
Alignment tape CR8-1B PS : 8-960-096-86
Dual trace oscilloscope
–2 mm screw driver

Check procedure

1. Connect an oscilloscope.
   CH-1 : TP5/AP-31 board (G-1)
   CH-2 : TP205/AP-31 board (D-1)
2. Playback the audio 10 kHz, –10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Press down the tape at both sides of the audio/timecode head lightly and check that audio level does not increase.
   If the level increases, perform the following adjustment.

Adjustment procedure

4. Turn the two head fixing screws as shown by 1/4 to 1/2 turn to rotate the head so that the maximum playback level is obtained in both channels.
5. Tighten the head fixing screw
   Tightening torque: 0.2 to 0.3 N · m
   (2 to 3 kgf · cm)
6. Press down the tape at both sides of the audio/timecode head lightly and check that audio level of both channels do not increase.



After completing this adjustment, be sure to perform the following items.

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.
   (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)

7-11. AUDIO/TIMECODE HEAD POSITION CHECK/ADJUSTMENT

Tools :

Alignment tape CR2-1B PS : 8-960-096-51
Dual trace oscilloscope
+3 mm screw driver
–3 mm screw driver

Check procedure

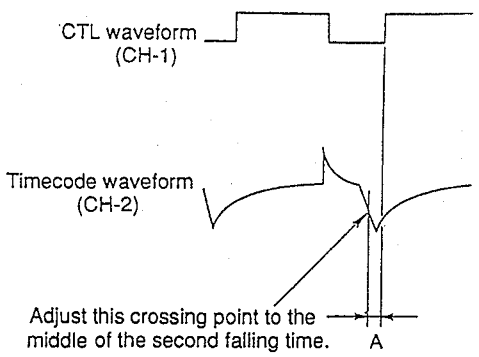
1. Connect an oscilloscope.
   CH-1 : TP203/SS-61 board (D-1)
   CH-2 : TP403/AP-31 board (D-1)
   TRIG : CH-1
2. Playback the alignment tape CR2-1B PS.
3. Check that the timecode waveform time difference with respect to CTL waveform satisfy the specifications.
   If the specifications is not satisfied, perform the following adjustment.

Adjustment procedure

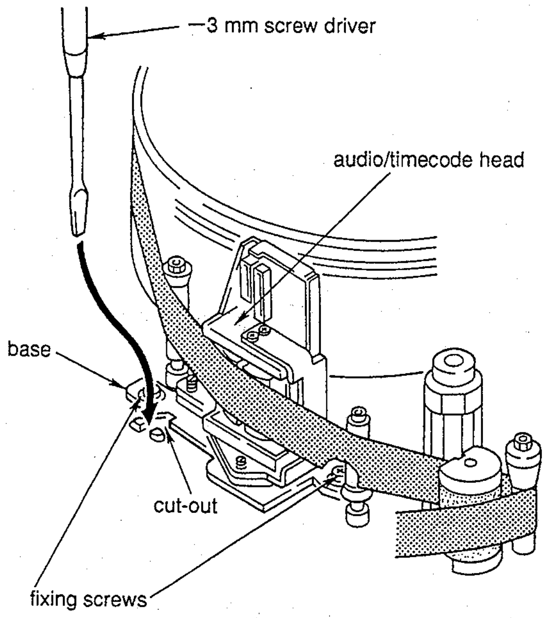
4. Loosen the two head fixing screws as shown by 1/4 to 1/2 turn.
5. Insert –3 mm screw driver tip into the cut-out of base. Adjust to satisfy the specifications.
6. Tighten the head fixing screw.

After completing this adjustment, be sure to perform the following items.

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.
   (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)


CTL waveform
(CH-1)
Timecode waveform
(CH-2)
Adjust this crossing point to the middle of the second falling time.
A

Specification : $A = 0 \pm 400\ \mu\text{sec}$


–3 mm screw driver
audio/timecode head
base
cut-out
fixing screws

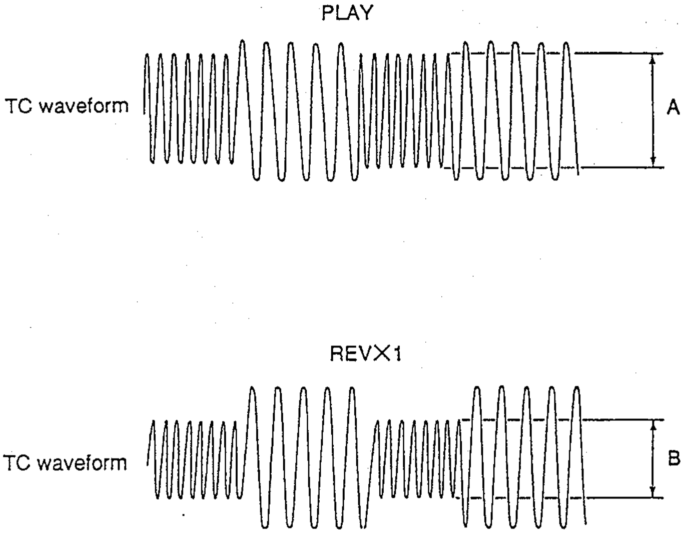
7-12. REV TAPE PATH CHECK/ADJUSTMENT

Tools :

Alignment tape CR5-1B PS : 8-960-096-91
Alignment tape CR2-1B PS : 8-960-096-51
Dual trace oscilloscope
Box driver (4.5 mm diagonally)

Check procedure

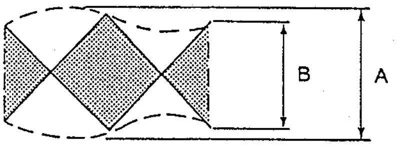
1. Connect an oscilloscope.
   CH-1 : TP403/AP-31 board (D-1)
2. Playback the alignment tape CR5-1B PS and establish the play mode. Take note of the timecode output level "A".
3. Establish the REV ×1 mode. Compare the timecode output level "B" with that of play mode. Check that the specifications is satisfied.



Specification : $\frac{B}{A} \geqq 90\ \%$

4. Connect an oscilloscope
   CH-1 : TP101/VP-44 board (L-2)
   CH-2 : TP102/VP-44 board (P-1)
   TRIG : CH-2
5. Playback the alignment tape CR2-1B PS in REV ×1 mode. Check that RF waveform satisfies the specifications.

<REV>



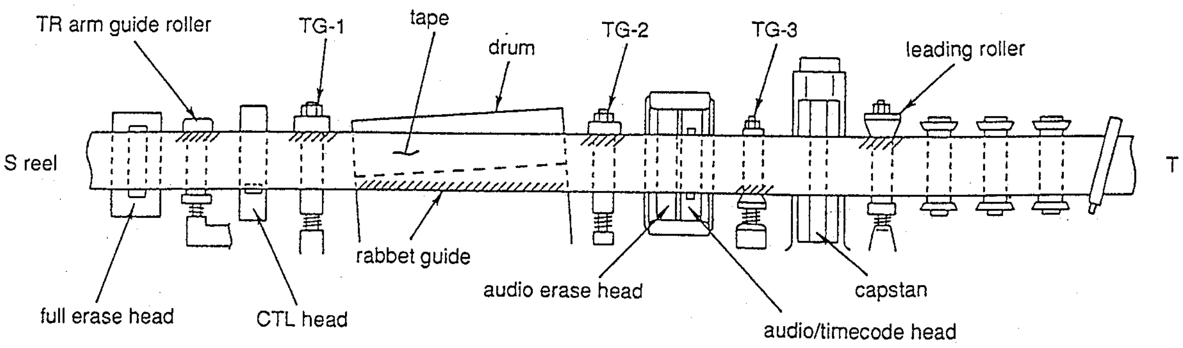
Specification : $\frac{B}{A} \geqq 60\ \%$

6. (1) The tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2, TG-3 and leading roller must be less than 1/10 of tape width.
   (2) There must not exist tape curl at drum rabbet guide (entrance and exit).
7. Switch the mode from play to REV × 1 tape speed. Check that the tape wrinkle disappears within one second between the leading roller - capstan - TG-3.
8. If the specifications in steps 3, 6 and 7 are not satisfied, perform the following adjustment.

Adjustment procedure

9. Adjust height of the leading roller to remove the tape wrinkle between the leading roller – capstan – TG-3, when switching between play – REV × 1 is repeated. The timecode output level must satisfies the step 5 specifications.
10. If the specifications in step 5 is not satisfied, check the following tape path.

Tape path condition


TR arm guide roller
TG-1
tape
drum
TG-2
TG-3
leading roller
S reel
T reel
rabbet guide
audio erase head
capstan
full erase head
CTL head
audio/timecode head

///// portions are either contacting or pushing the tape .

7-13. RF SWITCHING POSITION ADJUSTMENT

After the tape path alignment (refer to section 7-2), make sure to perform the RF switching adjustment.
RF switching pulse has the AUTO and MANUAL mode adjustments.
Perform this adjustment in AUTO mode first. If the adjustment in AUTO cannot generate satisfactory result, perform this adjustment in MANUAL mode.

Preparation

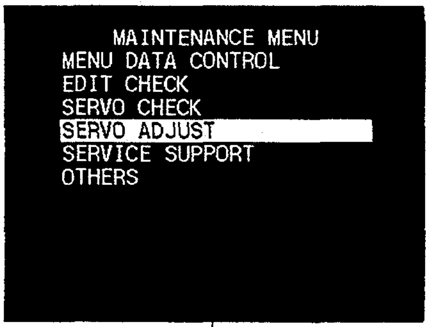
Connect the video monitor to the VIDEO OUTPUT 2 connector on the rear panel in order to display the characters.

Tools :

Alignment tape CR2-1B PS : 8-960-096-51

[AUTO Adjustment]

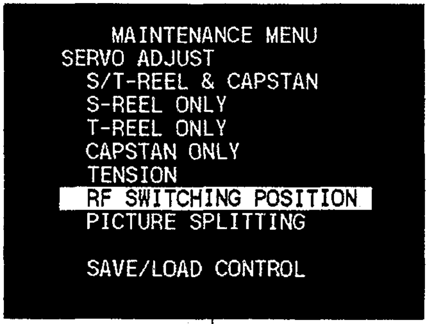
1. Display "MAINTENANCE MENU" on the monitor.
   (1) Press the menu key while holding down the left arrow key on the subcontrol panel to display "MAINTENANCE MENU".
2. Press the up or down arrow key to select "SERVO ADJUST".



```
    MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST
SERVICE SUPPORT
OTHERS
```

3. Press the right arrow key to display screen ①.
4. Press the up or down arrow key to select "RF SWITCHING POSITION".

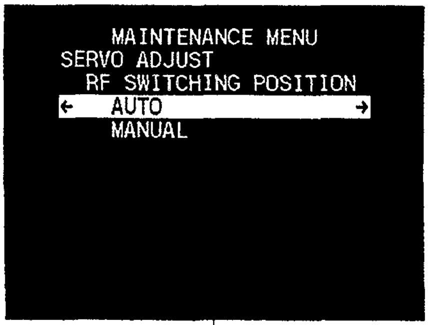
①



```
    MAINTENANCE MENU
SERVO ADJUST
  S/T-REEL & CAPSTAN
  S-REEL ONLY
  T-REEL ONLY
  CAPSTAN ONLY
  TENSION
  RF SWITCHING POSITION
  PICTURE SPLITTING

  SAVE/LOAD CONTROL
```

5. Press the right arrow key to display screen ②.
6. Press the up or down arrow key to select "AUTO".

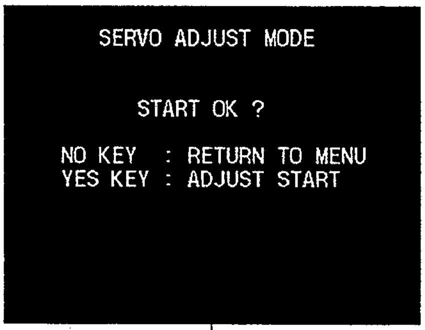
②



```
    MAINTENANCE MENU
SERVO ADJUST
  RF SWITCHING POSITION
←   AUTO                  →
    MANUAL
```

7. Press the right arrow key to display screen ③ "START OK?".

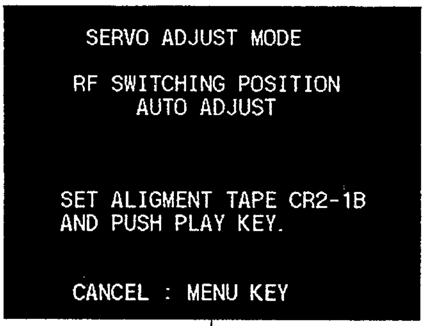
③



```
SERVO ADJUST MODE

    START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```

8. Press the YES key.

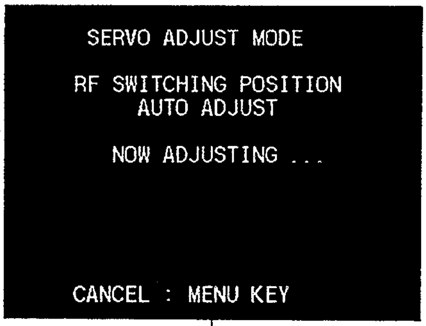
④



```
SERVO ADJUST MODE

RF SWITCHING POSITION
    AUTO ADJUST


SET ALIGMENT TAPE CR2-1B
AND PUSH PLAY KEY.


CANCEL : MENU KEY
```

9. Play back alignment tape CR2-1B PS. The unit enters the automatic adjustment mode of the RF switching position.

⑤



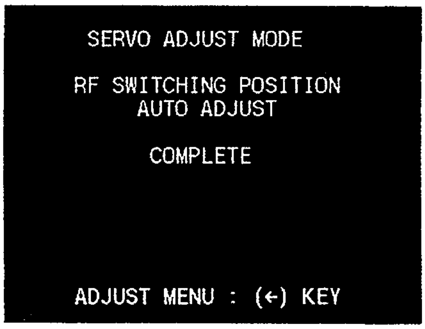
```
SERVO ADJUST MODE

RF SWITCHING POSITION
    AUTO ADJUST
  NOW ADJUSTING ...



CANCEL : MENU KEY
```

10. The adjustment is completed, and ⑥ "COMPLETE" is displayed.

    Note : When the "ADJUSTMENT INCOMPLETE" is displayed on the monitor, check that the alignment tape is CR2-1B PS.

11. The alignment tape is automatically ejected after the adjustment is completed.
12. Press the left arrow key twice to return to screen ①.
13. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
14. Press the menu key to display "MAINTENANCE MENU".

⑥

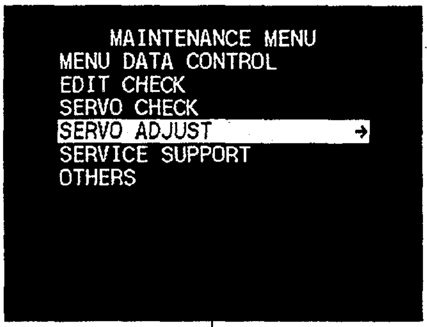


```
SERVO ADJUST MODE

RF SWITCHING POSITION
    AUTO ADJUST
     COMPLETE



ADJUST MENU : (←) KEY
```

[MANUAL Adjustment]

1. Connect an oscilloscope.
   CH-1 : TP-103/VP-44 board (L-1)
   CH-2 : TP-102/VP-44 board (P-1)
   TRIG : CH-2

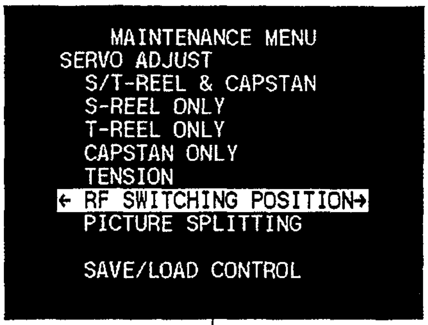
2. Display "MAINTENANCE MENU" on the monitor.
   (1) Press the menu key while holding down the left key of the subcontrol panel to display MAINTENANCE MENU. Then the modes are displayed on the monitor.
3. Press the up or down arrow key to select "SERVO ADJUST".



```
    MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST            →
SERVICE SUPPORT
OTHERS
```

4. Press the right arrow key to display screen ①.
5. Press the up or down arrow key to select "RF SWITCHING POSITION".

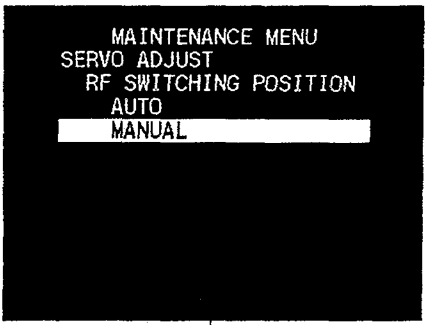
①



```
    MAINTENANCE MENU
SERVO ADJUST
  S/T-REEL & CAPSTAN
  S-REEL ONLY
  T-REEL ONLY
  CAPSTAN ONLY
  TENSION
← RF SWITCHING POSITION→
  PICTURE SPLITTING

  SAVE/LOAD CONTROL
```

6. Press the right arrow key to display screen ②.
7. Press the up or down key to select "MANUAL".

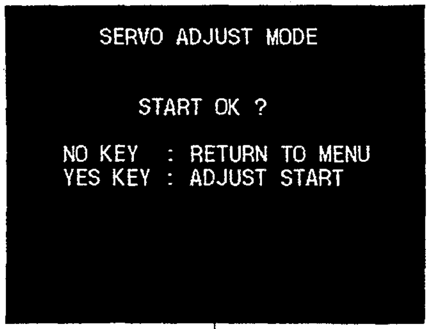
②



```
    MAINTENANCE MENU
SERVO ADJUST
  RF SWITCHING POSITION
    AUTO
    MANUAL
```

8. Press the right key to display screen ③ "START OK?".
9. Press the YES key.

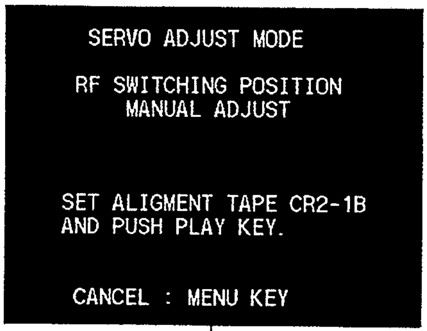
③



```
   SERVO ADJUST MODE

      START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```

10. Play back alignment tape CR2-1B PS.

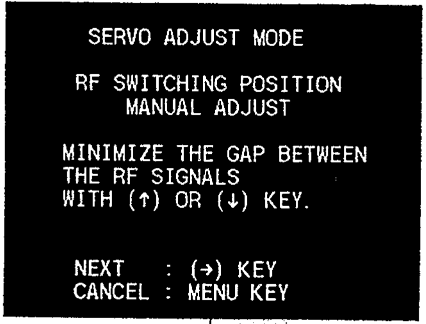
④



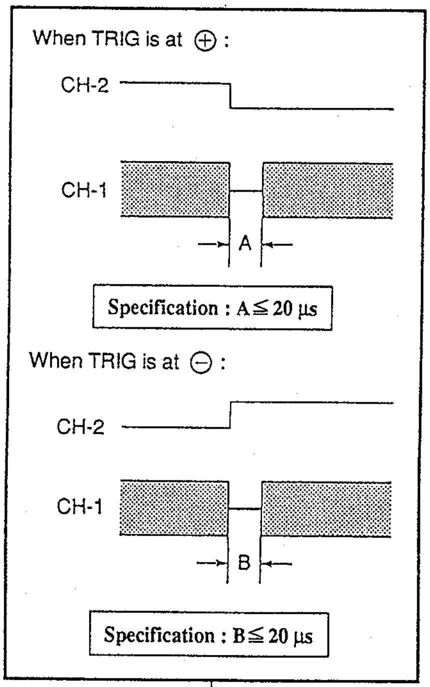
```
SERVO ADJUST MODE

RF SWITCHING POSITION
MANUAL ADJUST


SET ALIGMENT TAPE CR2-1B
AND PUSH PLAY KEY.


CANCEL : MENU KEY
```

11. Press the up or down arrow key so that the RF switching position is within the specification.

⑤



```
SERVO ADJUST MODE

RF SWITCHING POSITION
MANUAL ADJUST

MINIMIZE THE GAP BETWEEN
THE RF SIGNALS
WITH (↑) OR (↓) KEY.


NEXT   : (→) KEY
CANCEL : MENU KEY
```

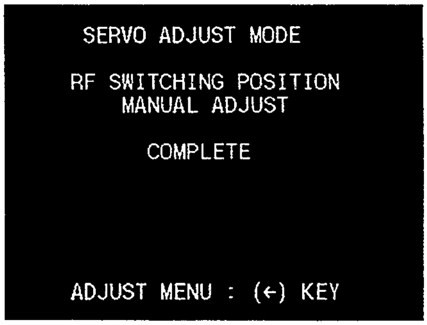


Specification : A ≦ 20 μs

Specification : B ≦ 20 μs

12. Press the right arrow key to display screen ⑥.
13. The adjustment is completed, and "COMPLETE" is displayed.
14. The alignment tape is automatically ejected after the adjustment is completed.
15. Press the left key twice to return to screen ①.
16. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
17. Press the menu key to display "MAINTENANCE MENU".

⑥



SERVO ADJUST MODE

RF SWITCHING POSITION
MANUAL ADJUST

COMPLETE

ADJUST MENU : (←) KEY

7-14. PICTURE SPLITTING COMPENSATION ADJUSTMENT

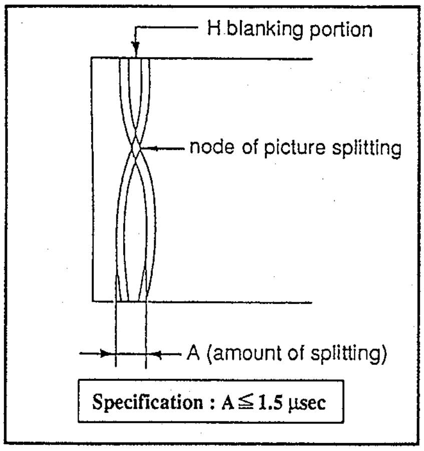
This adjustment is not required usually.
Perform this adjustment only if there is picture splitting.
The "picture splitting" is a phenomenon as illustrated on the right :

Tools :

Alignment tape CR5-1B PS : 8-960-096-91
Two video monitors :
(It may not be possible to monitor a picture splitting on the monitor which uses a strong AFC.)

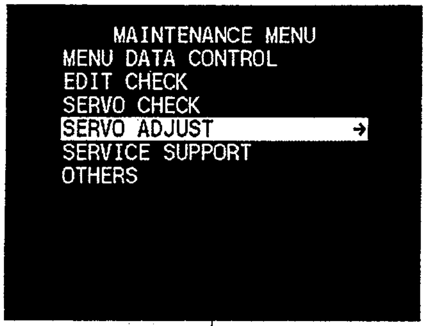
Checking Method

1. Connect one of the video monitors to VIDEO OUTPUT 2 on the rear panel.
2. Connect the other monitor as follows :
   (1) Use the BNC cable tied together, etc. to connect the video monitor to TP201/(P-1) on the VP-44P board.
   (2) Set up the video monitor as follows :
   - H DELAY
   - AFC FAST
   - INT SYNC
3. Insert alignment tape CR5-1B PS to the set, and play back the color bar signal.
4. Check that whether there is picture splitting or not.
   Specification : A≦1.5 μsec
   (1/5 of a color bar width or less)



Adjustment Method

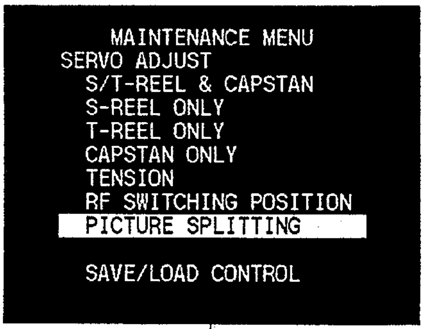
5. If the specification is not satisfied, perform the next adjustment.
6. Display "MAINTENANCE MENU" on the monitor.
   (1) Press the menu key while holding down the left arrow key to display "MAINTENANCE MENU".
7. Press the up or down arrow key to select "SERVO ADJUST".



```
    MAINTENANCE MENU
MENU DATA CONTROL
EDIT CHECK
SERVO CHECK
SERVO ADJUST              →
SERVICE SUPPORT
OTHERS
```

8. Press the right arrow key to display screen ①.
9. Press the up or down arrow key to select "PICTURE SPLITTING".

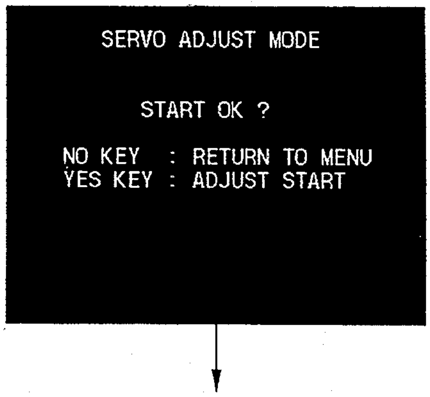
①



```
    MAINTENANCE MENU
SERVO ADJUST
  S/T-REEL & CAPSTAN
  S-REEL ONLY
  T-REEL ONLY
  CAPSTAN ONLY
  TENSION
  RF SWITCHING POSITION
  PICTURE SPLITTING

  SAVE/LOAD CONTROL
```

10. Press the right arrow key to display screen ② "START OK?".
11. Press the YES key.

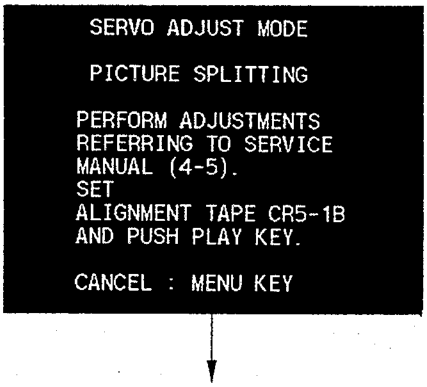
②



```
SERVO ADJUST MODE

START OK ?

NO KEY  : RETURN TO MENU
YES KEY : ADJUST START
```

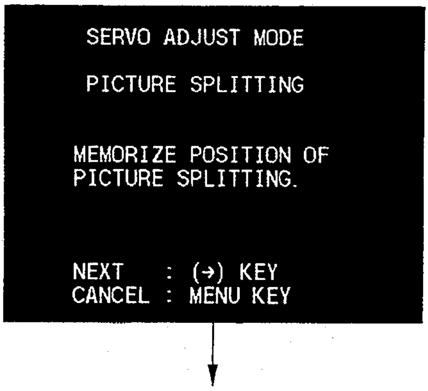
12. Play back the color bar signals (14:00 to 17:00) of alignment tape CR5-1B PS.
13. Check the position of the node of the picture splitting on the monitor.
    (It is recommended to mark the position using a tape on the position.)

③



```
SERVO ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (4-5).
SET
ALIGNMENT TAPE CR5-1B
AND PUSH PLAY KEY.

CANCEL : MENU KEY
```

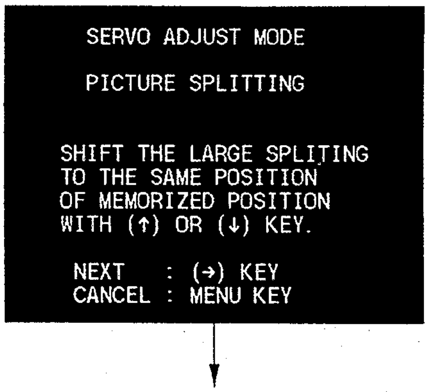
④



```
SERVO ADJUST MODE

PICTURE SPLITTING


MEMORIZE POSITION OF
PICTURE SPLITTING.


NEXT   : (→) KEY
CANCEL : MENU KEY
```

14. Press the right arrow key to display screen ⑤.
15. Press the up or down key to align the positions of the node marked in step 13 and the node on the display.

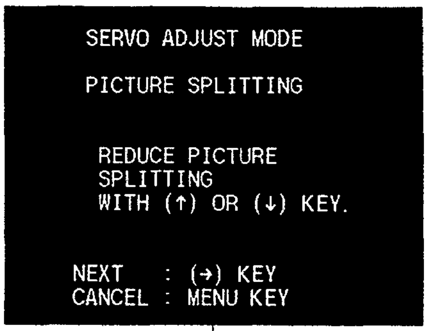
⑤



```
SERVO ADJUST MODE

PICTURE SPLITTING


SHIFT THE LARGE SPLITING
TO THE SAME POSITION
OF MEMORIZED POSITION
WITH (↑) OR (↓) KEY.

NEXT   : (→) KEY
CANCEL : MENU KEY
```

16. Press the right arrow key to display screen ⑥.
17. Press the up or down key to decrease the amount of the splitting to the minimum level.

⑥



SERVO ADJUST MODE

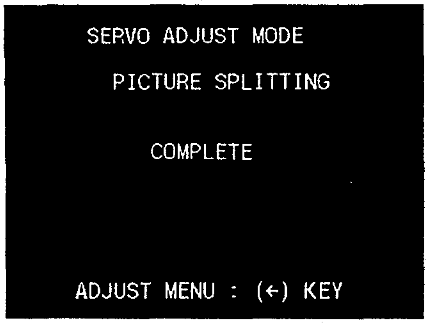
PICTURE SPLITTING

REDUCE PICTURE
SPLITTING
WITH (↑) OR (↓) KEY.

NEXT : (→) KEY
CANCEL : MENU KEY

18. Press the right arrow key to display screen ⑦.
19. The adjustment is completed, and "COMPLETE" is displayed.
20. The alignment tape is automatically ejected after the adjustment is completed.
21. Press the left key twice to return to screen ①.
22. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
23. Press the menu key to display "MAINTENANCE MENU".

⑦



SERVO ADJUST MODE

PICTURE SPLITTING

COMPLETE

ADJUST MENU : (←) KEY

SECTION 8
ELECTRICAL ALIGNMENT OVERVIEW

8-1. ADJUSTMENT COMPONENT INDEX

AP-31 board

RV1	CH-1 PB DOLBY OFF FREQ. RESP.	11-9, 13-17
RV2	CH-1 PB DOLBY OFF FREQ. RESP.	11-9, 13-17
RV3	CH-1 PB LEVEL	11-10, 13-18
RV4	CH-1 EE OUTPUT LEVEL	11-11, 13-19
RV5	CH-1 AUDIO METER	11-10, 13-18
RV201	CH-2 PB DOLBY OFF FREQ. RESP.	11-9, 13-17
RV202	CH-2 PB DOLBY OFF FREQ. RESP.	11-9, 13-17
RV203	CH-2 PB LEVEL	11-10, 13-18
RV204	CH-2 EE OUTPUT LEVEL	11-11, 13-19
RV205	CH-2 AUDIO METER	11-10, 13-18

AR-14 board

LV101	CH-1 BIAS TRAP	11-12, 13-20
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RV107	CH-1 OVERALL FREQ. RESP.	11-14, 13-22
RV206	CH-2 OVERALL LEVEL	11-14, 13-21
RV207	CH-2 OVERALL FREQ. RESP.	11-14, 13-22
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RV302	CH-1 BIAS CURRENT	11-12, 13-20
T101	CH-1 BIAS CURRENT	11-12, 13-20
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SS-61 board

CV1	CHARACTER SIZE	9-3, 13-61

RP-70 board

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CV701	INTERNAL SC FREQ.	12-22
CV702	HCK1 ERROR VOLT	12-22
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LV400	C WCK NORMAL VCO CENTER	12-23
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RV200	PB C A/D INPUT LEVEL	12-28
RV300	PB VIDEO PHASE	12-50, 13-33
RV301	Y WCK FREQ.	12-24
RV400	PB COMPOSITE Y/C DELAY	12-52, 13-35, 13-46
RV401	C WCK FREQ.	12-25
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RV502	PB COMPONENT R-Y LEVEL	12-29, 13-30, 13-40
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RV701	INTERNAL SC PHASE	12-31, 13-36
RV703	REF CF PHASE	12-33
RV706	SYNC PHASE	12-24, 12-25, 12-49, 12-50, 12-83, 12-84, 13-32, 13-33, 13-52, 13-53
RV707	SC PHASE	12-32

VP-44 board

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RV102	PB COMPONENT Y FREQ. RESP.	12-20, 13-37
RV103	PB Y RF LEVEL	12-17
RV201	PB Y DEMOD. OUTPUT LEVEL	12-19
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RV401	PB C DEMOD. OUTPUT LEVEL	12-19
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RV503	G BALANCE	12-37
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RV505	G LEVEL	12-37
RV506	G SYNC LEVEL	12-37
RV507	G DC LEVEL	12-38
RV508	S SYNC LEVEL	12-47
RV509	CAV Y LEVEL	12-35
RV510	VIDEO 1 LEVEL	12-43
RV511	S-Y LEVEL	12-47
RV512	VIDEO 2 LEVEL	12-43
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RV602	PB COMPOSITE SC LEAK	12-44, 13-42
RV603	PB COMPOSITE SC LEAK	12-44, 13-42
RV604	PB COMPOSITE 1 BURST LEVEL	12-45, 13-44
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RV702	PB COMPONENT Y/C DELAY	12-53, 13-47
RV703	PB COMPONENT R-Y LEVEL	12-36
RV704	PB COMPONENT B-Y LEVEL	12-36
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RV706	B BALANCE	12-39
RV707	R LEVEL	12-41
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VRA-7 board

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LV301	H LOCK LOOP VCO CENTER	12-54
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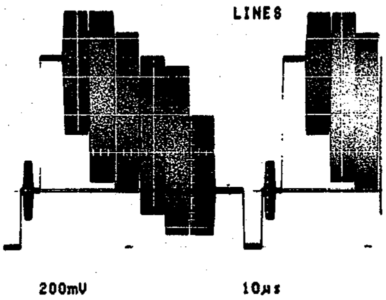
8-2. REQUIRED EQUIPMENT

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-131A (op. 03)	
	Composite	TEKTRONIX TSG-131A (op. 03)	
	Y/C	TEKTRONIX TSG-131A (op. 03)	S-VIDEO SG
Waveform Monitor	Component	TEKTRONIX WFM300/300A/1781/1765 (op. SC)	
	Composite	TEKTRONIX 1751/1781/1765 (op. SC)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6845	

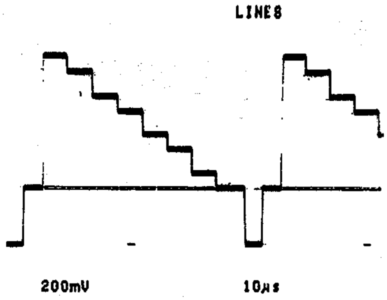
8-3. TEST SIGNAL

1. 100 % COLOR BARS

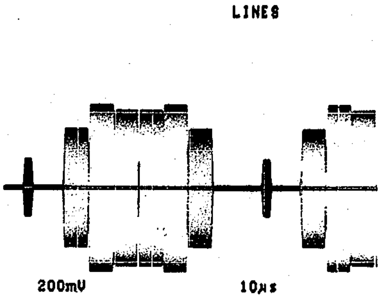
COMPOSITE



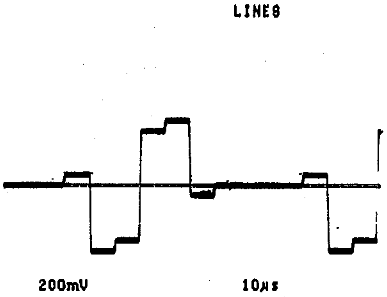
Y, S-Y



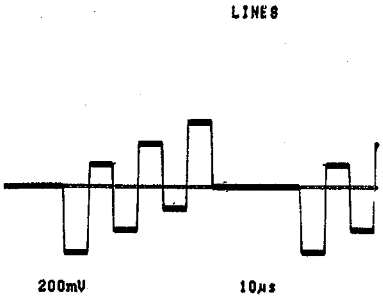
S-C



R-Y

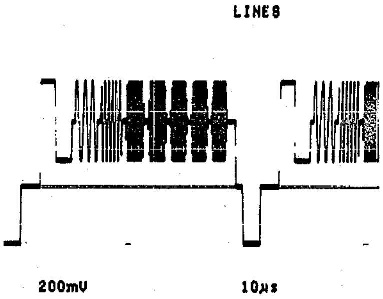


B-Y

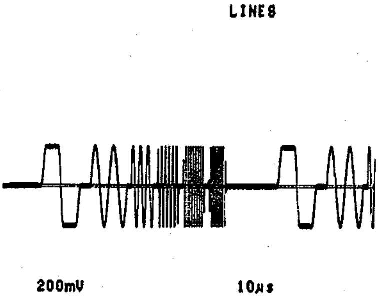


2. 60 % MULTI BURST

Y

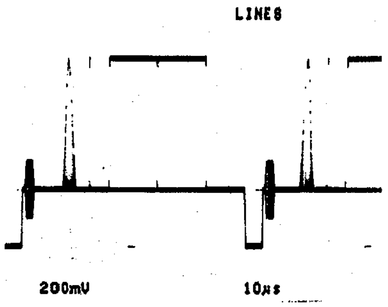


C

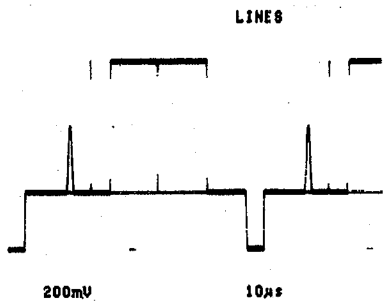


3. PULSE & BAR

COMPOSITE

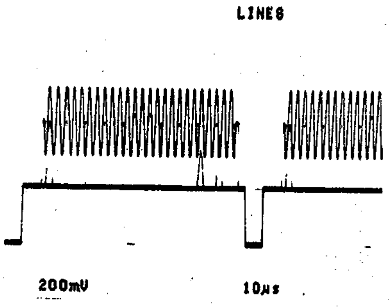


Y

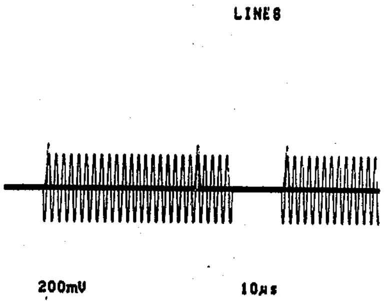


4. 50 % BOWTIE

Y



C



8-4. MAINTENANCE MENU

The servo alignment is done by Servo system is adjusted automatically or semiautomatically in the maintenance menu, SERVO ADJUST. For details, refer to section 4-4, SERVO ADJUST.

How to enter the maintenance menu

1. While pressing the $\boxed{\leftarrow}$ key, press the MENU key.
   Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the $\boxed{\uparrow}$, $\boxed{\downarrow}$ keys to select the item to change.
   Move the high lighted item to select the item on a monitor display.
3. Press the $\boxed{\rightarrow}$ key at the item to select.
   This selects the high lighted item.

How to close the maintenance menu

Press the MENU key.

SECTION 9
POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

[Equipments Required]

- Digital Voltmeter (ADVANTEST TR6845)
- Picture Monitor
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

Contents

TIME min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5 : 00	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation
16 : 30		75 kHz Deviation
17 : 00	50 % Bowtie & 10T	No-Signal
19 : 00	Line 17A Signal	
22 : 00	Quad Phase	
24 : 00	50 % Flat Field	
26 : 00	100 % Color Bars with Dropout	
28 : 00	Composite H-Sweep with VISC	
30 : 00		

9-1. SWITCHING REGULATOR VOLTAGE ADJUSTMENT (+5 V)

[NOTE]

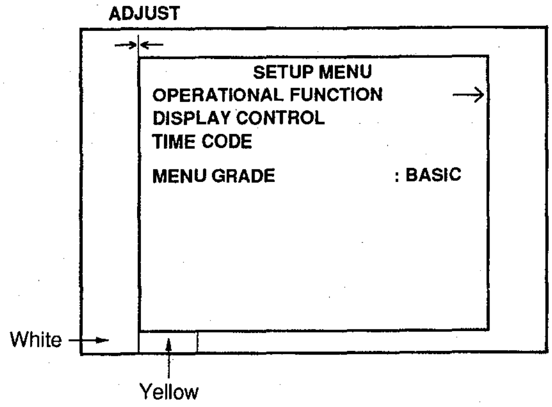
- Avoid alignment of the power supply unless it is positive that alignment is necessary.

Preparations for Adjustment	Adjustments • Specification
• Set the ⊘ RV201/switching regulator to mechanical center position. NOTE : When checking, be careful not to short between connector pins.	CN3-6 pin/SS-61 (P-1) ⊘ **RV201**/switching regulator spec. : **+5.0 ± 0.1 V dc**

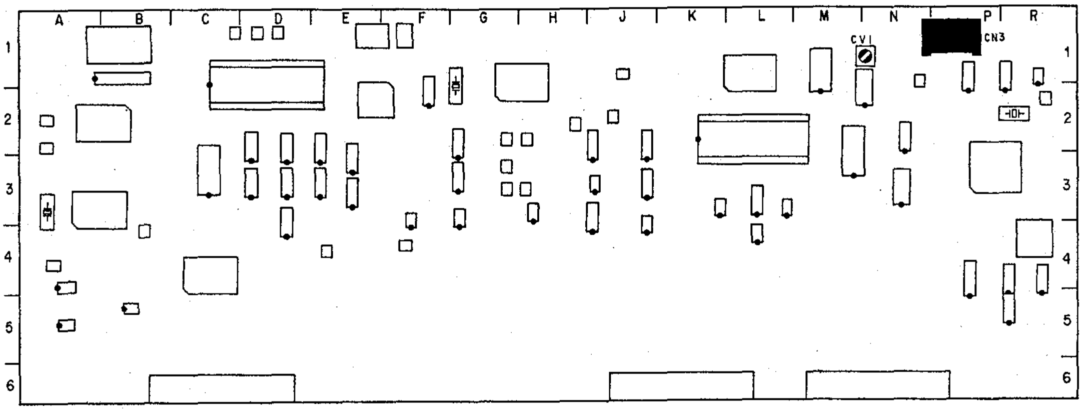
9-2. SWITCHING REGULATOR VOLTAGE CHECK

Preparations for Adjustment	Adjustments • Specification
NOTE : When checking, be careful not to short between connector pins.	(Voltage checks) CN3-1pin/SS-61 (P-1) **+12.0 ± 0.75 V dc** CN3-2pin/SS-61 (P-1) **$+6.5^{+0.75}_{-0.5}$ V dc** CN3-4pin/SS-61 (P-1) **+8.5 ± 0.5 V dc** CN3-5pin/SS-61 (P-1) **+12.5 ± 1 V dc** CN3-6pin/SS-61 (P-1) **+5.0 ± 0.25 V dc** CN3-8pin/SS-61 (P-1) **+5.25 ± 0.35 V dc** +5 V specification: When performing only the voltage check, the specification shown in not section 9-1 (+5. 0 ± 0.1 V) but section 9-2 (+5.0 ± 0.25 V) must be satisfied.

9-3. CHARACTER SIZE ADJUSTMENT

Preparations for Adjustment	Adjustments • Specification
• CHARACTER switch (sub control panel) : ON • Press the MENU button on the sub control panel once. • PB mode 100 % Color-bar/CR5-1B PS (14:00 - 17:00) • After adjustment is completed, press the MENU button and display the original picture.	VIDEO 2 (SUPER) OUTPUT (75 Ω terminated) ⊘ CV1/SS-61 (N-1) Adjust the setup menu display, and position the left side frame at the bounder between the white and yellow signals of the color bars signal. Then, position the all sides frames at the center of the monitor.  ADJUST SETUP MENU OPERATIONAL FUNCTION DISPLAY CONTROL TIME CODE MENU GRADE : BASIC White Yellow

SS-61 board


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
CV1
CN3

SECTION 10
SERVO ALIGNMENT

Servo system is adjusted automatically or semiautomatically in the maintenance menu.

For details, refer to section 4-4, SERVO ADJUST.

SECTION 11
AUDIO ALIGNMENT

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Audio Signal Generator (HP 8904 or equivalent)
- Audio Level Meter (HP 3400A or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent

  NOTE : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Contents

TIME min. s	AUDIO TRACK
0 : 00	1 kHz / 0 VU
3 : 00	15 kHz / 0 VU
5 : 00	1 kHz / – 20 VU
6 : 00	40 kHz / – 20 VU
6 : 30	7 kHz / – 20 VU
7 : 00	10 kHz / – 20 VU
7 : 30 8 : 00	15 kHz / – 20 VU

∗ 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (+ 4 dB) should be corrected according to the correction value as follows.

example) Correction value = – 0.5 dB

Output level = + 4 dB – 0.5 dB = + 3.5 dB

[SWITCH / VOLUME / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Connector Panel>
AUDIO INPUT CH-1 600 Ω : ON
AUDIO INPUT CH-2 600 Ω : ON

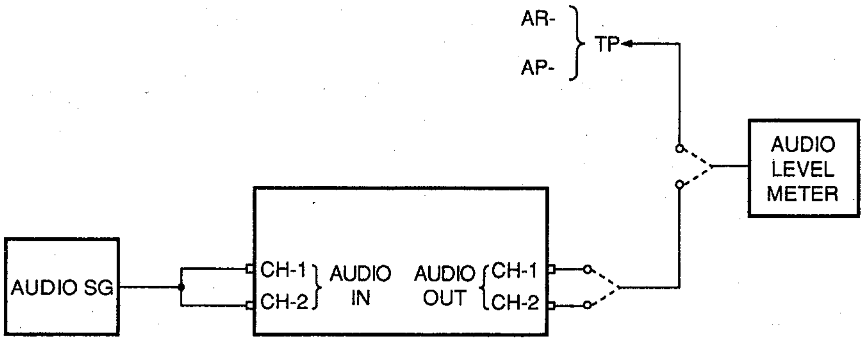
<Sub Control Panel>

CTL / LTC / U-BIT	: LTC
CHARACTER	: OFF
REMOTE / LOCAL	: LOCAL

<Switch Setting on Printed Circuit Board>

S201-2 / SS-61	: CLOSE (ON) · · · · NR OFF

[CONNECTION]


AR-
AP-
TP
AUDIO LEVEL METER
AUDIO SG
CH-1
CH-2
AUDIO IN
AUDIO OUT
CH-1
CH-2

[PRECAUTION AND NOTES ON ALIGNMENT]

Precaution

Cleaning of stationary heads

Clean three stationary heads by the cleaning piece moistened with cleaning fluid.
After the fluid blow off, wipe off the heads by a not-weaved cloth or cleaning piece.

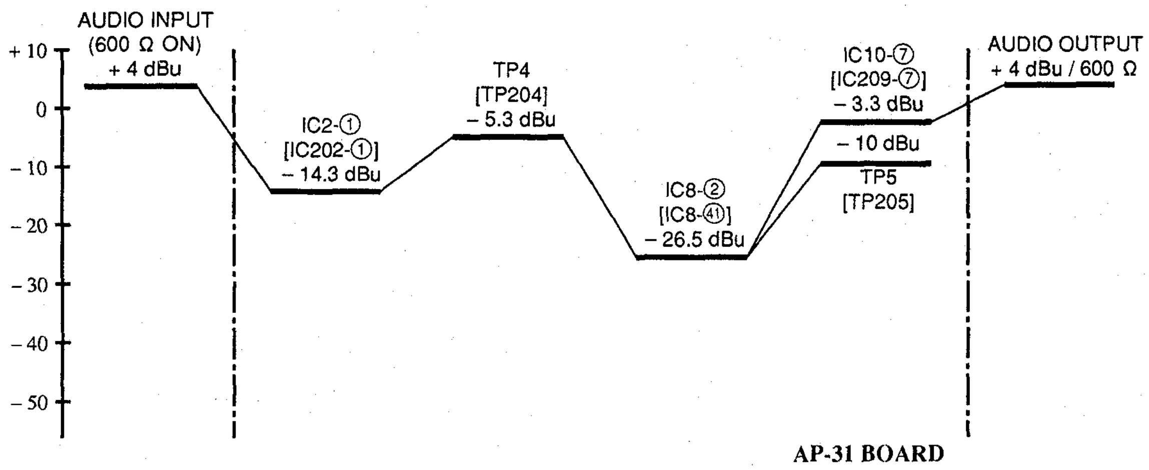
Notes for Alignment

- AUDIO OUTPUT is terminated by 600 Ω. (execept designated in particular)
- When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape level.
- The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

[LEVEL DIAGRAMS]

AUDIO SYSTEM LEVEL DIAGRAM

REC / EE MODE
REC LEVEL CONTROL : SET + 4 dBu ON OUTPUT



BOARD	TEST POINT	LEVEL		MODE
		dBu	mV rms	
AP-31	AUDIO IN	+ 4	1228	REC / EE
	TP4 [TP204]	- 5.3	421	REC / EE
	AUDIO OUT	+ 4 *	1228	REC / EE

[ ] .... CH-2, ∗ ..... 600 Ω TERMINATED

11-1. PB MODE ADJUSTMENT

11-1-1. PB Dolby off Frequency Response Adjustment

<table>
<tr><th>Conditions for adjustment</th><th>Adjustment point • Specifications</th></tr>
<tr><td>• PB mode
1 kHz, 7 kHz, 10 kHz,
15 kHz, – 20 VU / CR8-1B PS
(5 : 00 – 8 : 00)</td><td>AUDIO OUTPUT CH-1 / 2

CH-1
⊘ RV1 (10 kHz) / AP-31 (J-1)
⊘ RV2 (7 kHz) / AP-31 (J-1)

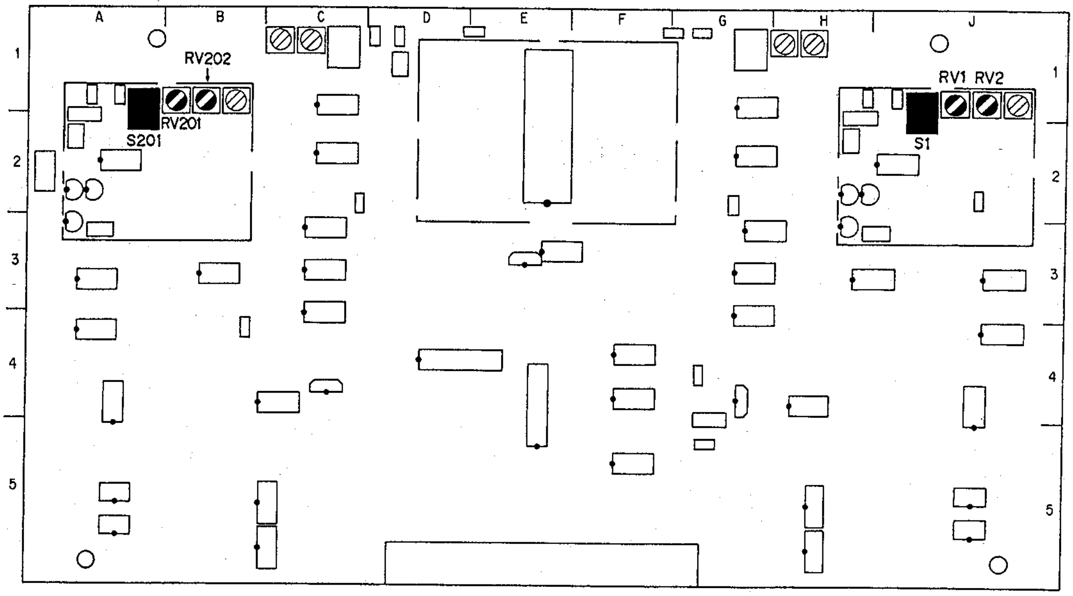
CH-2
⊘ RV201 (10 kHz) / AP-31 (B-1)
⊘ RV202 (7 kHz) / AP-31 (B-1)

Adjust alternately

If the specification of the high frequency is not satisfied, change the following switches and adjust again.
CH-1 S1 / AP-31 (J-1)
CH-2 S201 / AP-31 (A-1)

Spec.
<table>
<tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr>
<tr><td>1 k</td><td>0 (REF)</td></tr>
<tr><td>7 k</td><td>0 ± 0.2</td></tr>
<tr><td>10 k</td><td>0 ± 0.2</td></tr>
<tr><td>15 k</td><td>– 0.5 ± 0.5</td></tr>
</table></td></tr>
</table>

AP-31 board (A side)

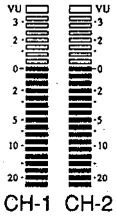


11-1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 1 kHz, 0 VU / CR8-1B PS (0 : 00 – 3 : 00)	CH-1 TP5 / AP-31 (G-1) ⊘ **RV3** / AP-31 (J-1) CH-2 TP205 / AP-31 (D-1) ⊘ **RV203** / AP-31 (B-1) Spec. **– 10.0 ± 0.1 dBu** [Check] AUDIO OUTPUT CH-1 / 2 Spec. **+ 4.0 ± 0.2 dBu**

11-2. EE MODE ADJUSTMENT

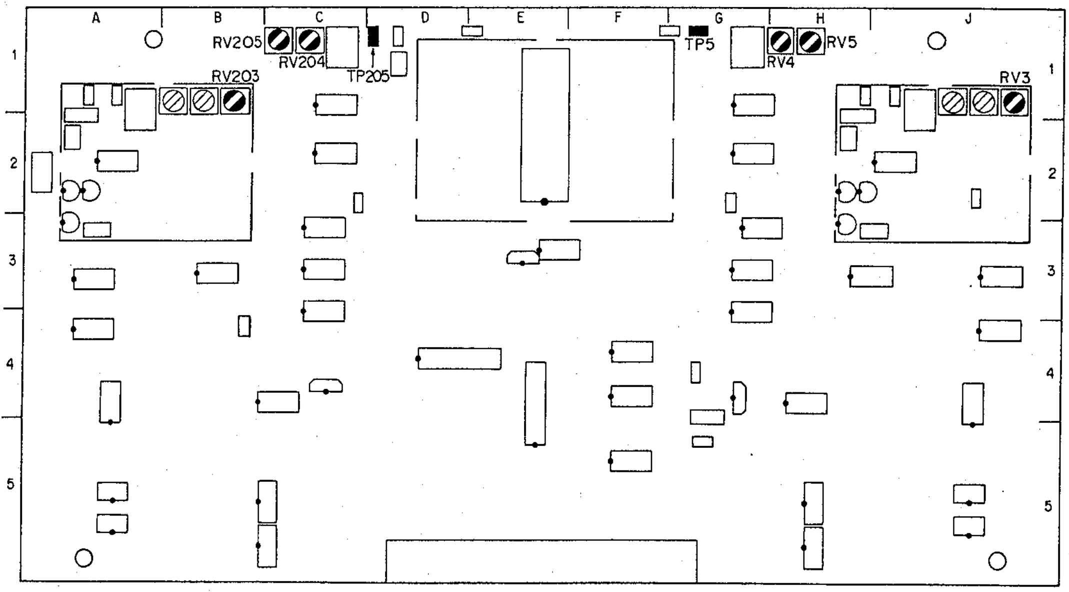
11-2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4.00 dBu • EE mode	Step 1 CH-1 TP5 / AP-31 (G-1) ⊘ **REC VR** / Sub-control Panel CH-2 TP205 / AP-31 (D-1) ⊘ **REC VR** / Sub-control Panel Spec. **– 10.00 ± 0.05 dBu** Step 2 AUDIO METER ⊘ **RV5** / AP-31 (H-1) ⊘ **RV205** / AP-31 (C-1)  Spec. The segment one step above 0 VU should be dimly lit

11-2-2. EE Output Level Adjustment

Conditions for adjustment	Adjustment point • Specifications	
• AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4.0 dBu • EE mode	AUDIO OUTPUT CH-1 / 2 CH-1 ⊘ **RV4** / AP-31 (H-1)	 CH-2 ⊘ **RV204** / AP-31 (C-1)
	Spec. + **4.0 ± 0.2 dBu**	

AP-31 board (A side)



A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV205
RV204
RV203
TP205
TP5
RV4
RV5
RV3

11-3. REC MODE ADJUSTMENT

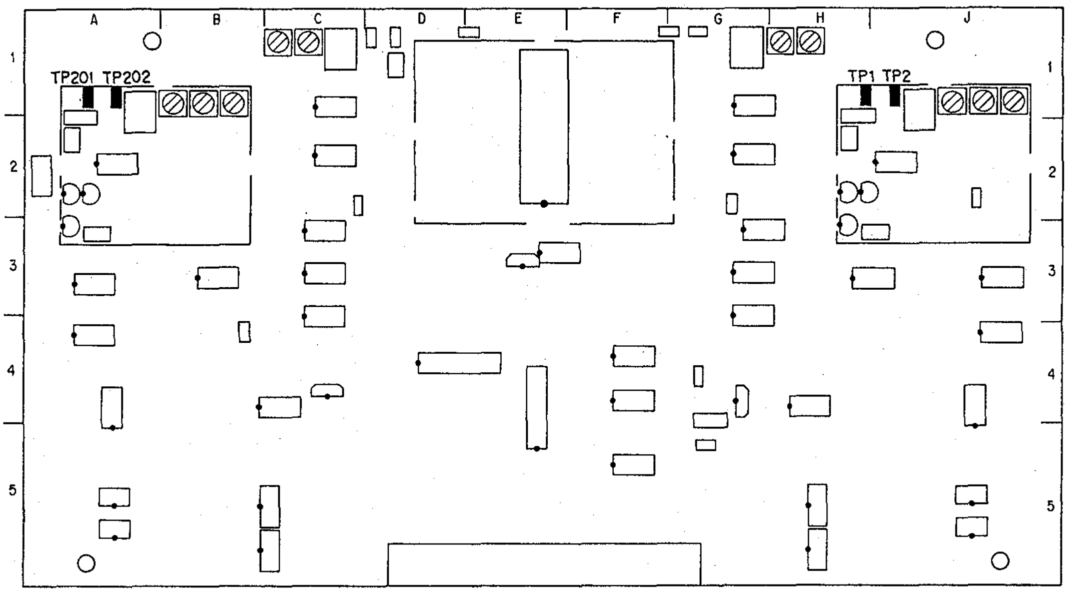
11-3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1 / 2 ; No signal • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) ⊘ **LV101** / AR-14 (C-2) CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) ⊘ **LV201** / AR-14 (A-2) Spec. **Bias leak → Minimize (≦ – 30 dBu)**

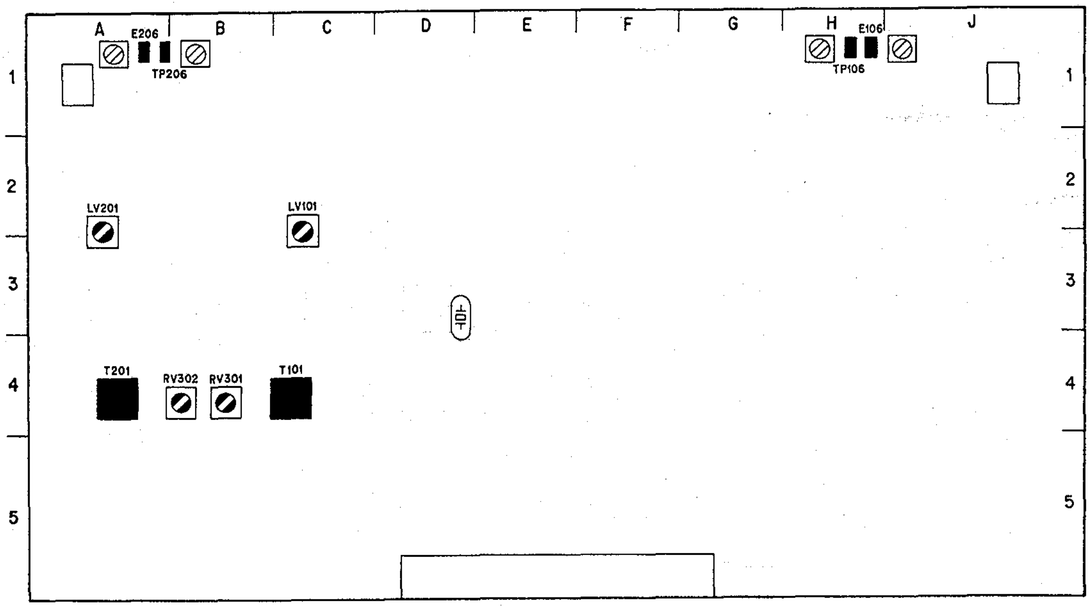
11-3-2. Bias Current Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1 / 2 ; No signal • REC mode Blank tape	Step 1 TP1 / AP-31 (H-1) GND : TP2 (J-1) ⊘ **T101** / AR-14 (C-4) TP201 / AP-31 (A-1) GND : TP202 (A-1) ⊘ **T201** / AR-14 (A-4) Spec. **Bias current → Maximize**
	Step 2 TP1 / AP-31 (H-1) GND : TP2 (J-1) ⊘ **RV301** / AR-14 (B-4) TP201 / AP-31 (A-1) GND : TP202 (A-1) ⊘ **RV302** / AR-14 (B-4) Spec. **16 ±1 mV rms**

AP-31 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
TP201
TP202
TP1
TP2

AR-14 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
E206
TP206
E106
TP106
LV201
LV101
T201
RV302
RV301
T101

11-4. OVERALL ADJUSTMENT

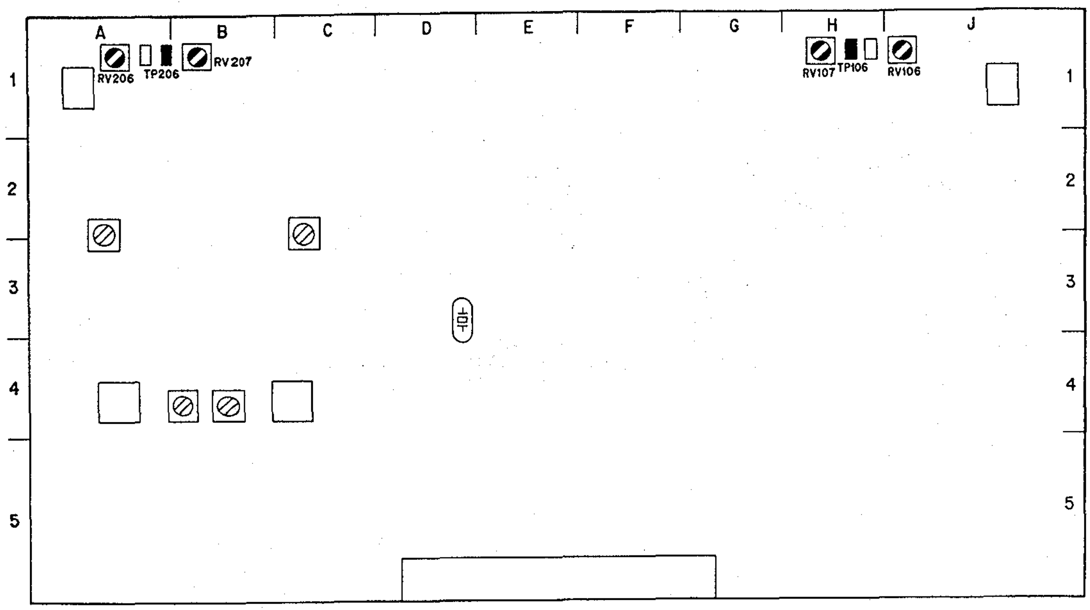
11-4-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4 dBu • Playback the recorded portion. Blank tape	AUDIO OUTPUT CH-1 / 2 Spec. **+ 4.0 ± 0.5 dBu** When specification is not satisfied → Step 2
Step 2 • AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4 dBu • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) ⊘ **RV106** / AR-14 (J-1) CH-2 TP206 / AR-14 (A-1) ⊘ **RV206** / AR-14 (A-1) Correct the difference level from the center value in Step 1. After the adjustment, check that perform Step 1.

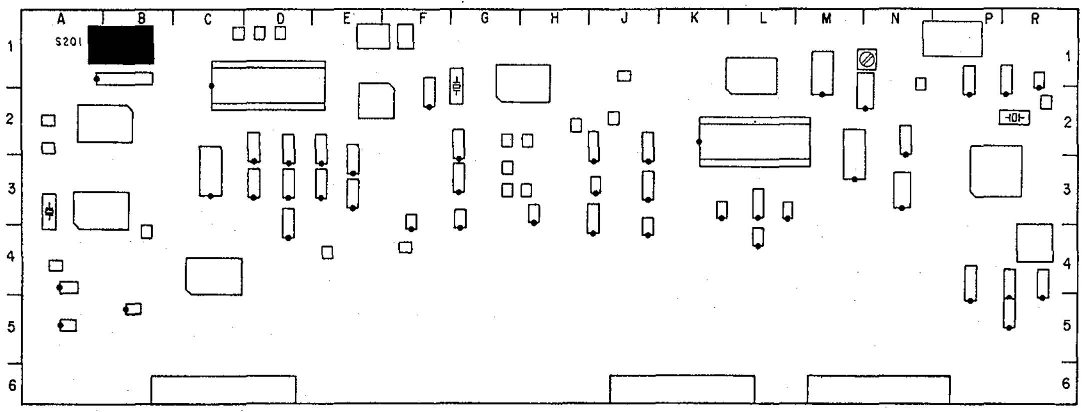
11-4-2. Overall Frequency Response Adjustment (Dolby on)

Conditions for adjustment	Adjustment point • Specifications
Step 1 • AUDIO INPUT CH-1 / 2 ; 12.5 kHz, + 4 dBu • S201-2 / SS-61 (B-1) ; OPEN (OFF)·····NR ON • Playback the recorded portion. Blank tape	AUDIO OUTPUT CH-1 / 2 Spec. **+ 3.5 ± 0.5 dBu** When specification is not satisfied → Step 2
Step 2 • AUDIO INPUT CH-1 / 2 ; 12.5 kHz, + 4 dBu • S201-2 / SS-61 (B-1) ; OPEN (OFF)·····NR ON • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) ⊘ **RV107** / AR-14 (H-1) CH-2 TP206 / AR-14 (A-1) ⊘ **RV207** / AR-14 (B-1) Correct the difference level × 0.8 from the center value in Step 1. After the adjustment, check that perform Step 1.

AR-14 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV206
TP206
RV207
RV107
TP106
RV106

SS-61 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
S201

SECTION 12
VIDEO ALIGNMENT

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
  - Component SG (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Composite SG (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Y / C (TEKTRONIX TSG-131A op. 03 or equivalent)
- Waveform Monitor (WFM)
  - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 (op. SC) or equivalent)
  - Composite (TEKTRONIX 1751 / 1781 / 1765 (op. SC) or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
- Sweep Generator (SHIBASOKU VS-12CX or equivalent)
- Picture Monitor
- Deviation Checker (SONY EW-580)
- Frequency Counter
- Current Probe (TEKTRONIX P6022 or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent

  Note : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

  Contents

TIME min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5 : 00	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation
16 : 30		75 kHz Deviation
17 : 00	50 % Bowtie & 10T	No-Signal
19 : 00	Line 17A Signal	
22 : 00	Quad Phase	
24 : 00	50 % Flat Field	
26 : 00	100 % Color Bars with Dropout	
28 : 00	Composite H-Sweep with VISC	
30 : 00		

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

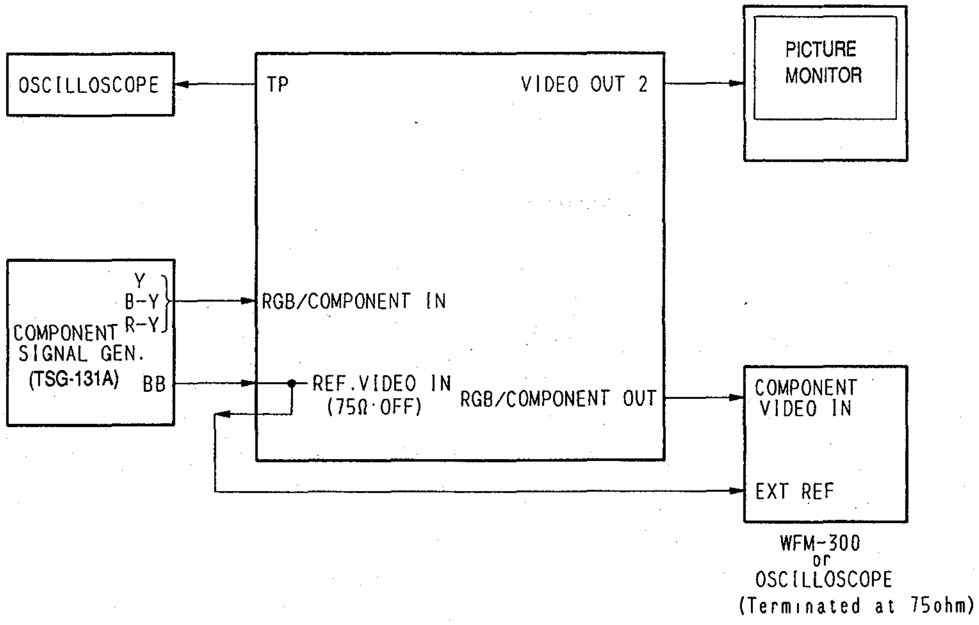
<Sub Control Panel>

VIDEO IN : COMPONENT
Y-R, B
REMOTE / LOCAL : LOCAL
CTL / LTC / U-BIT : LTC
CHARACTER : ON
COMPONENT OUT : Y-R, B

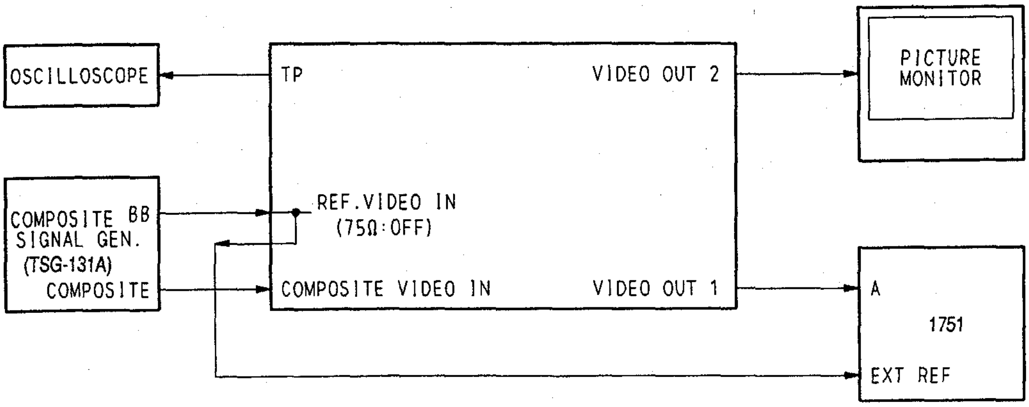
[CONNECTION]

Connect some equipment as following unless otherwise specified.

CONNECTION 1 SG : TSG-131A / Waveform Monitor : WFM-300 / Oscilloscope / Picture Monitor

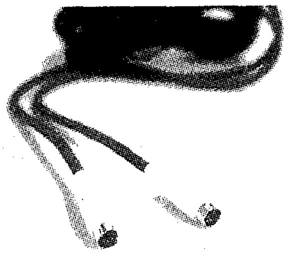

OSCILLOSCOPE
TP
VIDEO OUT 2
PICTURE MONITOR
Y
B-Y
R-Y
COMPONENT SIGNAL GEN. (TSG-131A)
BB
RGB/COMPONENT IN
REF.VIDEO IN (75Ω·OFF)
RGB/COMPONENT OUT
COMPONENT VIDEO IN
EXT REF
WFM-300 or OSCILLOSCOPE (Terminated at 75ohm)

CONNECTION 2 SG : TSG-131A / Waveform Monitor : 1751 / Oscilloscope / Picture Monitor

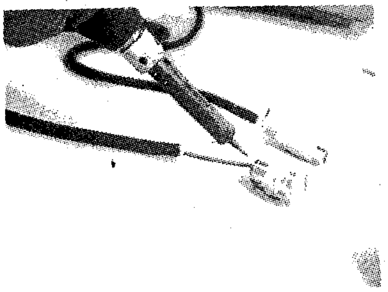

OSCILLOSCOPE
TP
VIDEO OUT 2
PICTURE MONITOR
COMPOSITE BB
SIGNAL GEN.
(TSG-131A)
COMPOSITE
REF.VIDEO IN
(75Ω:OFF)
COMPOSITE VIDEO IN
VIDEO OUT 1
A
1751
EXT REF

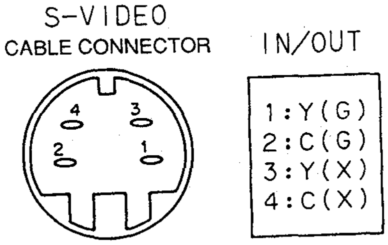
[PREPARATIONS AND NOTES ON ALIGNMENT]

Making the cable for measuring S-VIDEO input / output level.
S-terminal (Y / C) convert cable (BNC×2) is necessary to measuring S-VIDEO input / output level.
Preparation : S-S terminal connection cable about 5 meters in length (standard product) (SONY YC-50KV)

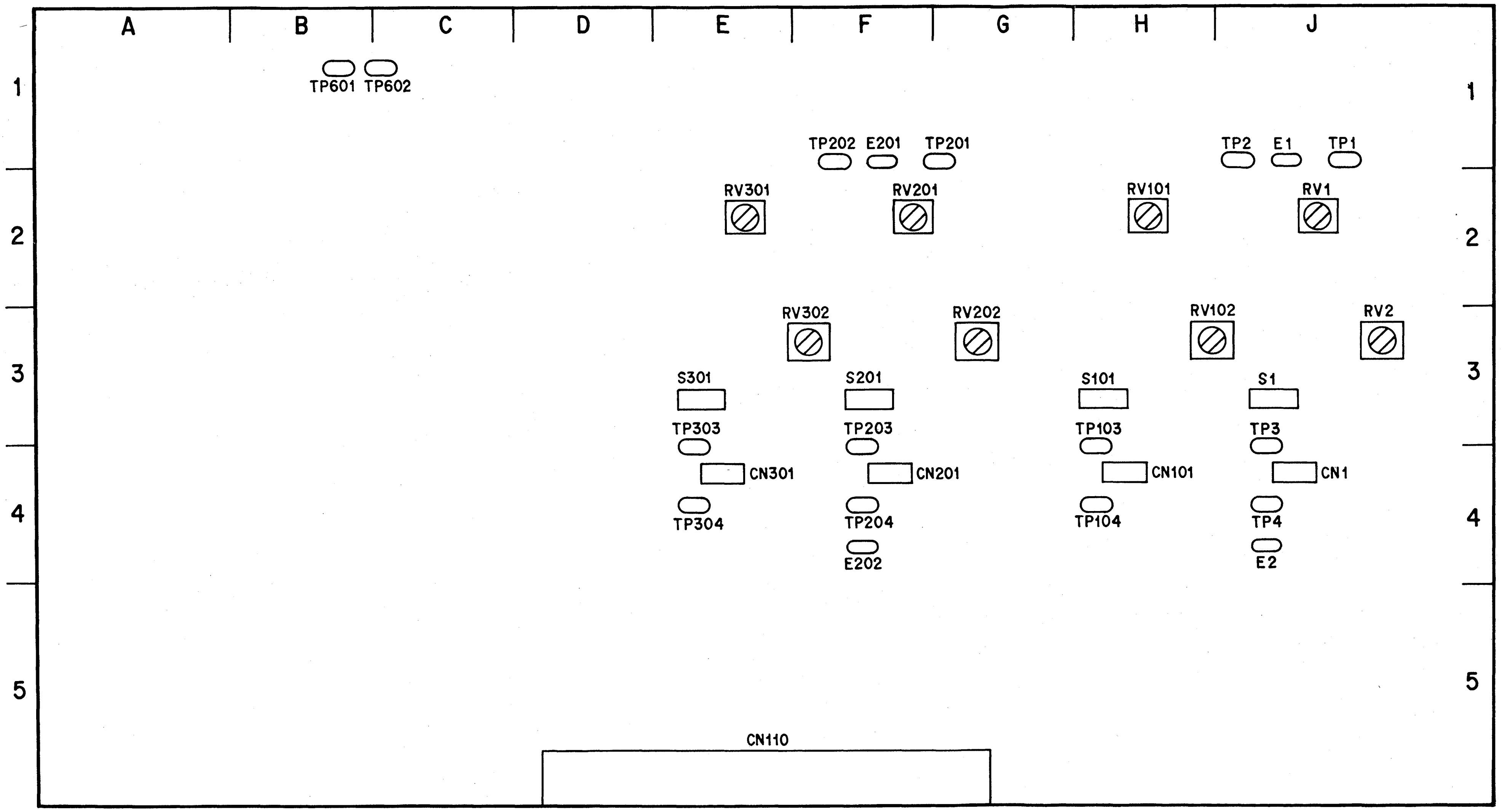


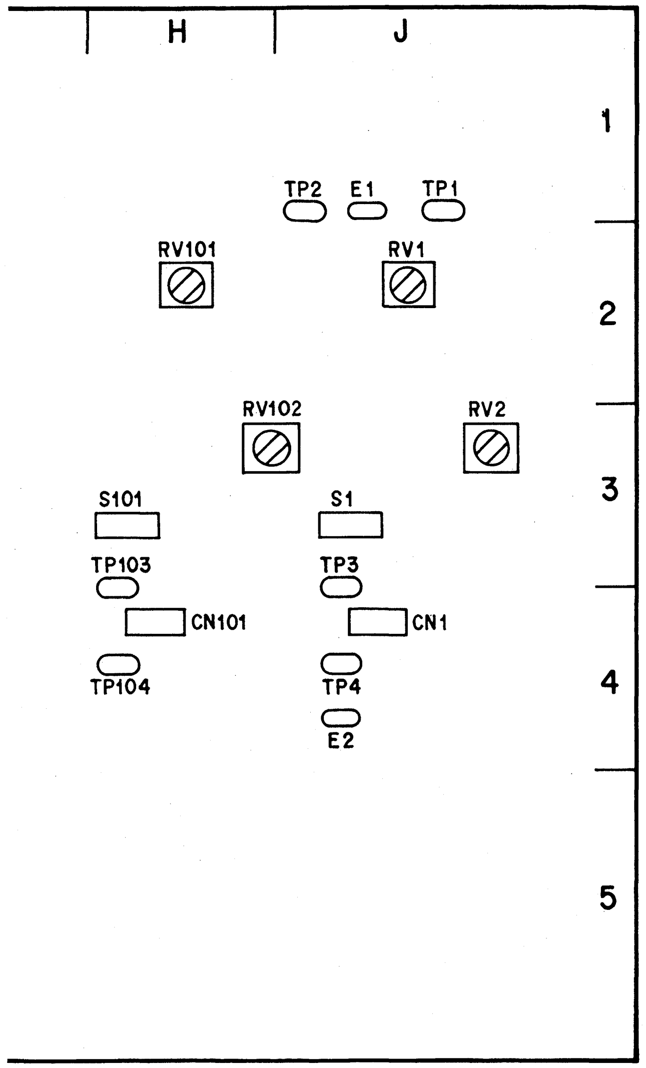
1. Cut the cable in half.
2. Tear and strip the cover of the cable with a cutter.
3. Strip the cover of the shield wire with a nipper.
4. Check the Y / C core wire with a tester.
5. Solder the BNC terminal for Y signal to the shield wire of Y signal in the cable and the BNC terminal for C signal to the shield wire of C signal.
   (Check the continuity with a tester.)



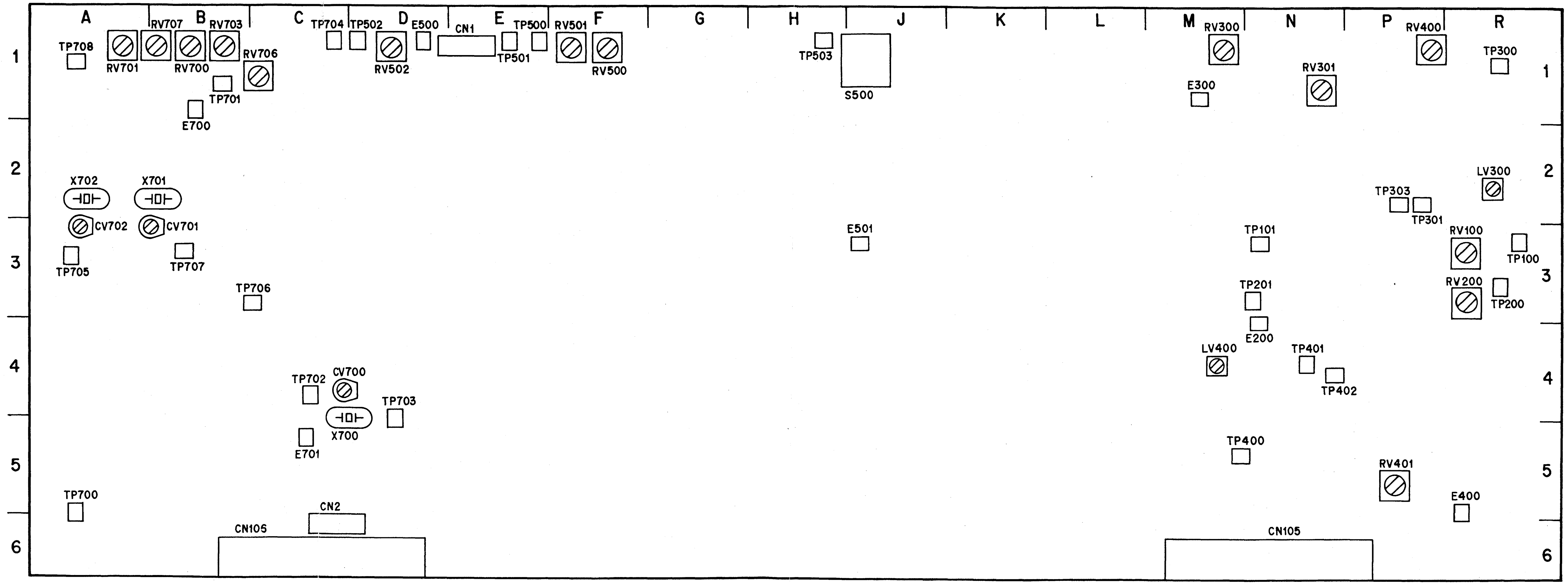

S-VIDEO
CABLE CONNECTOR
IN/OUT
4
3
2
1
1:Y(G)
2:C(G)
3:Y(X)
4:C(X)

RP-70 board (A side)

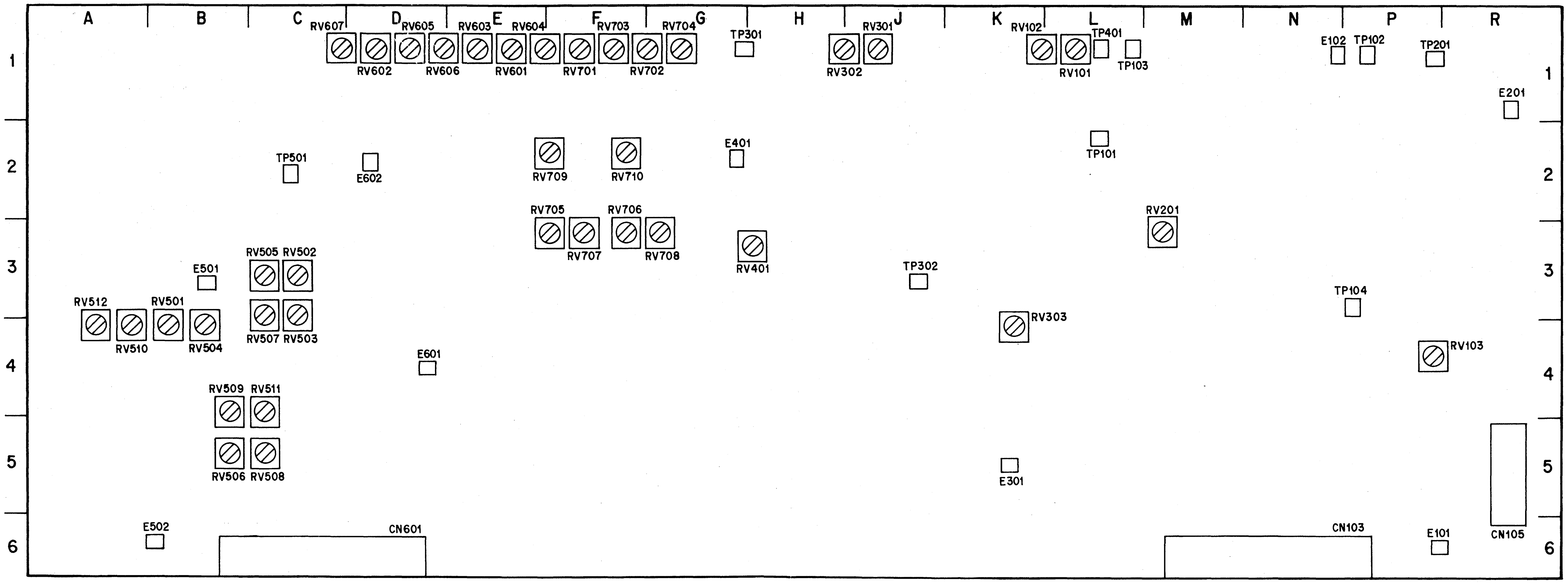

A
B
C
D
E
F
G
H
J
1
2
3
4
5
TP601
TP602
TP202
E201
TP201
TP2
E1
TP1
RV301
RV201
RV101
RV1
RV302
RV202
RV102
RV2
S301
S201
S101
S1
TP303
TP203
TP103
TP3
CN301
CN201
CN101
CN1
TP304
TP204
TP104
TP4
E202
E2
CN110


H
J
1
2
3
4
5
TP2
E1
TP1
RV101
RV1
RV102
RV2
S101
S1
TP103
TP3
CN101
CN1
TP104
TP4
E2

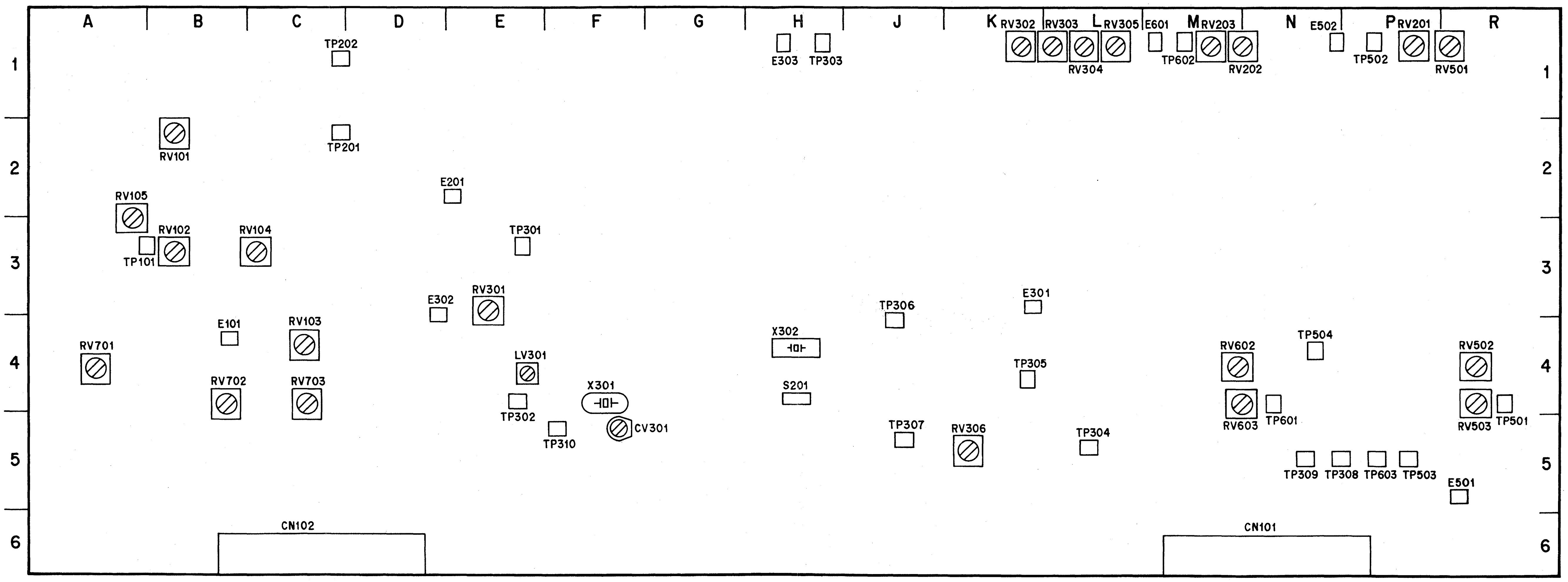
TBC-28 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP708
RV701
RV707
RV700
RV703
RV706
TP701
E700
TP704
TP502
RV502
E500
CN1
TP500
TP501
RV501
RV500
TP503
S500
RV300
E300
RV301
RV400
TP300
X702
X701
CV702
CV701
TP705
TP707
TP706
E501
TP101
TP303
TP301
LV300
RV100
TP100
RV200
TP200
TP201
E200
LV400
TP401
TP402
TP702
CV700
TP703
X700
E701
TP400
RV401
E400
TP700
CN2
CN105
CN105

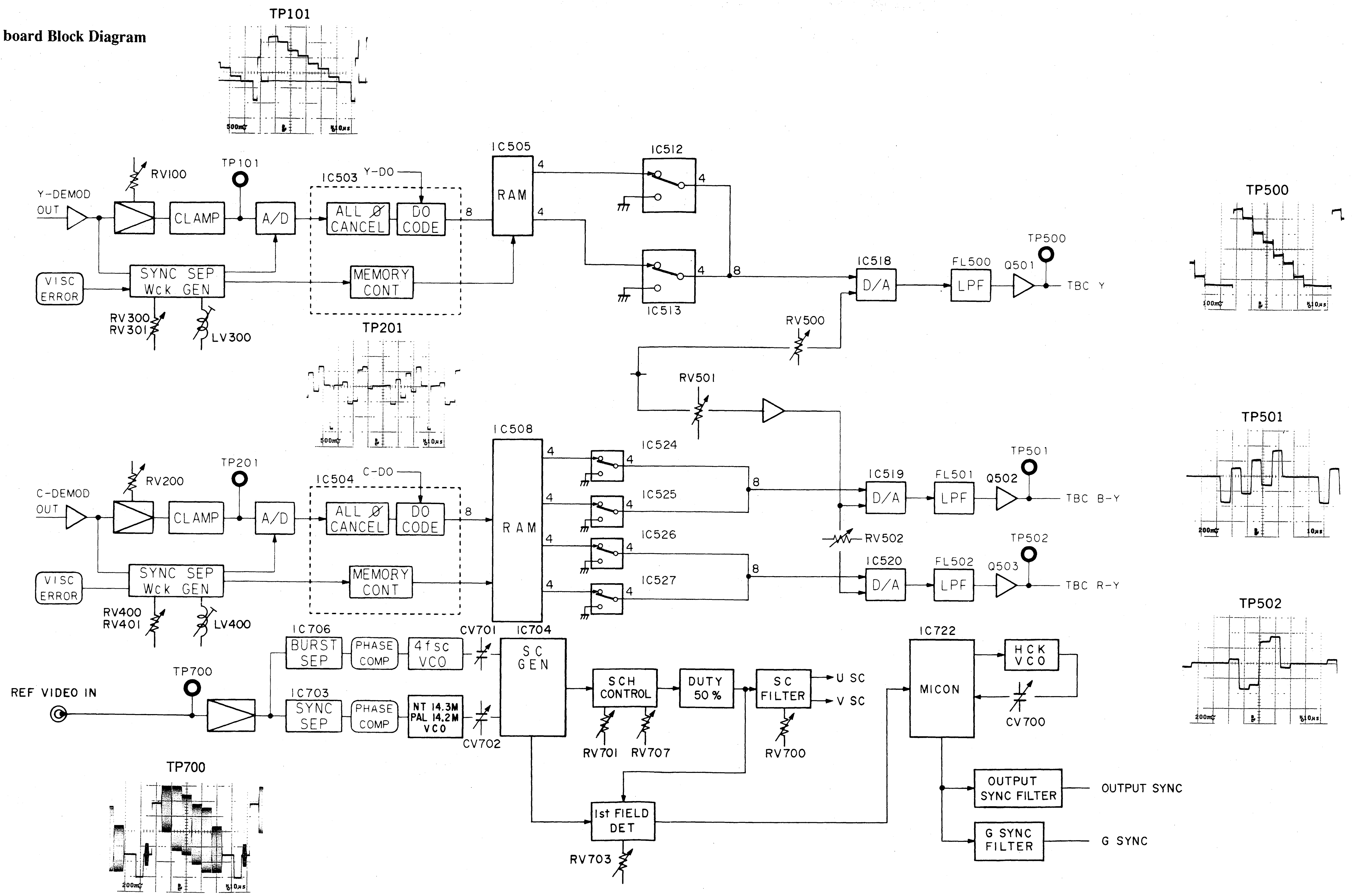
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV607
RV605
RV603
RV604
RV703
RV704
RV602
RV606
RV601
RV701
RV702
TP301
RV301
RV302
RV102
TP401
RV101
TP103
E102
TP102
TP201
E201
TP501
E602
RV709
RV710
E401
TP101
RV705
RV706
RV707
RV708
RV201
RV505
RV502
E501
RV401
TP302
RV512
RV501
RV510
RV504
RV507
RV503
TP104
RV303
RV103
E601
RV509
RV511
RV506
RV508
E301
E502
CN601
CN103
E101
CN105

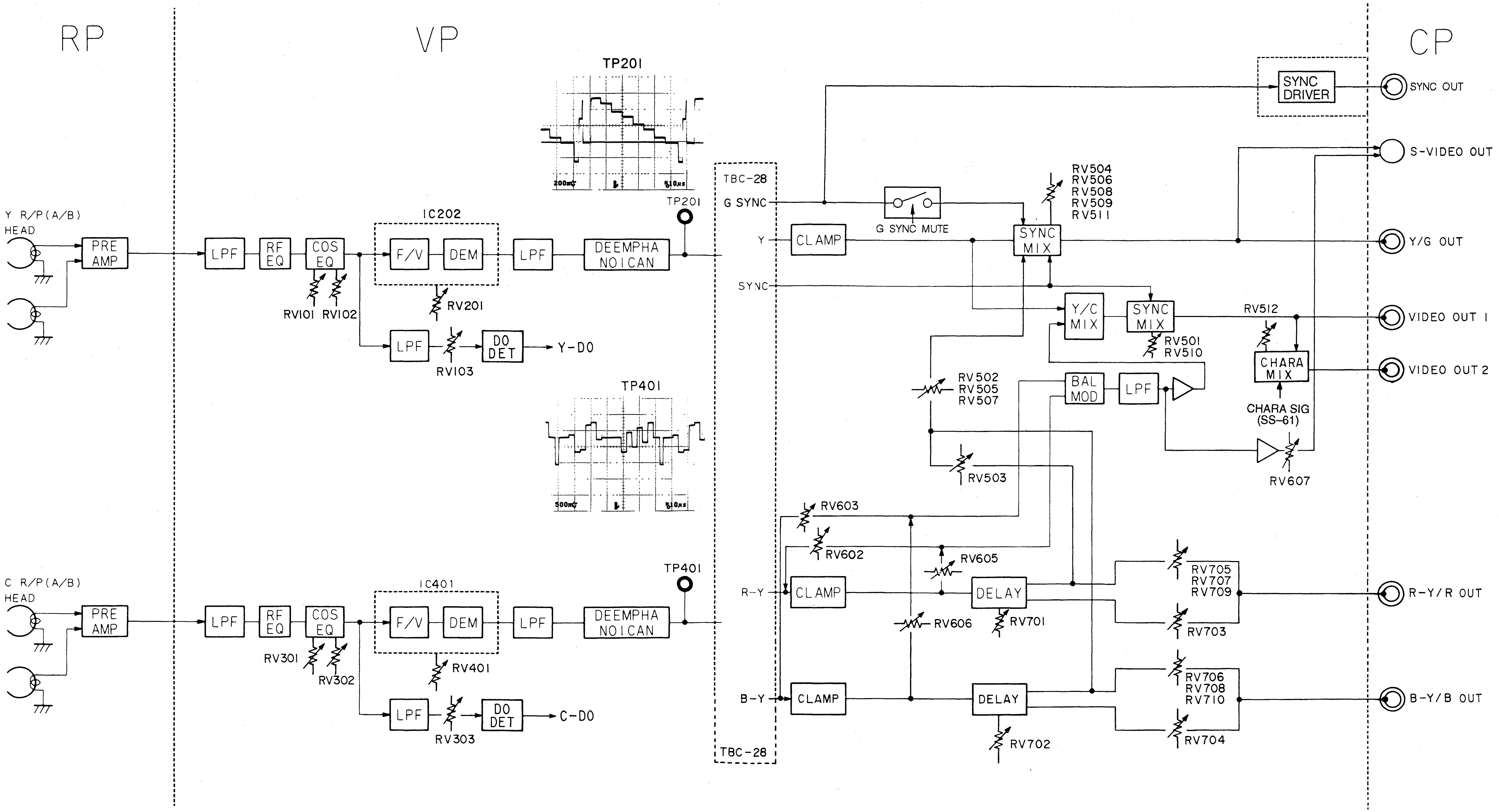
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP202
TP201
RV101
RV105
RV102
TP101
RV104
E201
TP301
E302
RV301
RV103
E101
RV701
RV702
RV703
LV301
TP302
TP310
X301
CV301
E303
TP303
X302
S201
TP306
TP307
RV306
E301
TP305
TP304
RV302
RV303
RV304
RV305
E601
TP602
RV203
RV202
E502
TP502
RV201
RV501
RV602
RV603
TP601
TP504
TP309
TP308
TP603
TP503
RV502
RV503
TP501
E501
CN102
CN101

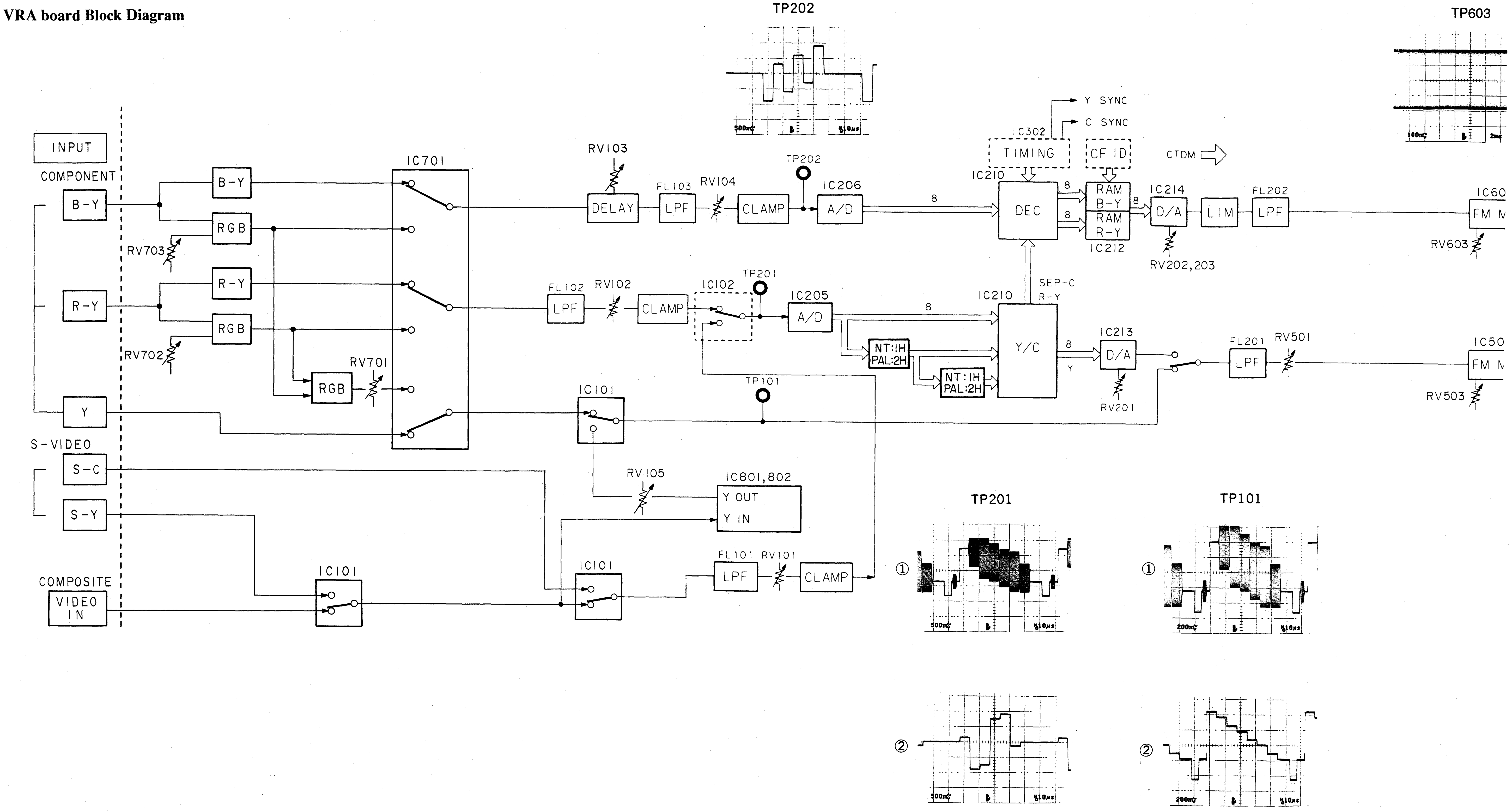
TBC board Block Diagram


TP101
Y-DEMOD OUT
RV100
CLAMP
A/D
IC503
Y-DO
ALL Ø CANCEL
DO CODE
8
IC505
RAM
4
4
IC512
4
8
IC513
VISC ERROR
SYNC SEP Wck GEN
MEMORY CONT
RV300
RV301
LV300
TP201
IC518
D/A
FL500
LPF
Q501
TP500
TBC Y
RV500
RV501
IC508
4
4
4
4
IC524
IC525
IC526
IC527
8
8
C-DEMOD OUT
RV200
CLAMP
A/D
IC504
C-DO
ALL Ø CANCEL
DO CODE
8
RAM
VISC ERROR
SYNC SEP Wck GEN
MEMORY CONT
RV400
RV401
LV400
IC519
D/A
FL501
LPF
Q502
TP501
TBC B-Y
RV502
IC520
D/A
FL502
LPF
Q503
TP502
TBC R-Y
IC706
BURST SEP
PHASE COMP
4fsc VCO
CV701
IC704
SC GEN
IC703
SYNC SEP
PHASE COMP
NT 14.3M PAL 14.2M VCO
CV702
REF VIDEO IN
TP700
SCH CONTROL
RV701
RV707
DUTY 50 %
SC FILTER
RV700
U SC
V SC
1st FIELD DET
RV703
IC722
MICON
HCK VCO
CV700
OUTPUT SYNC FILTER
OUTPUT SYNC
G SYNC FILTER
G SYNC
TP500
TP501
TP502
TP700
500mV
200mV
100mV
10µs

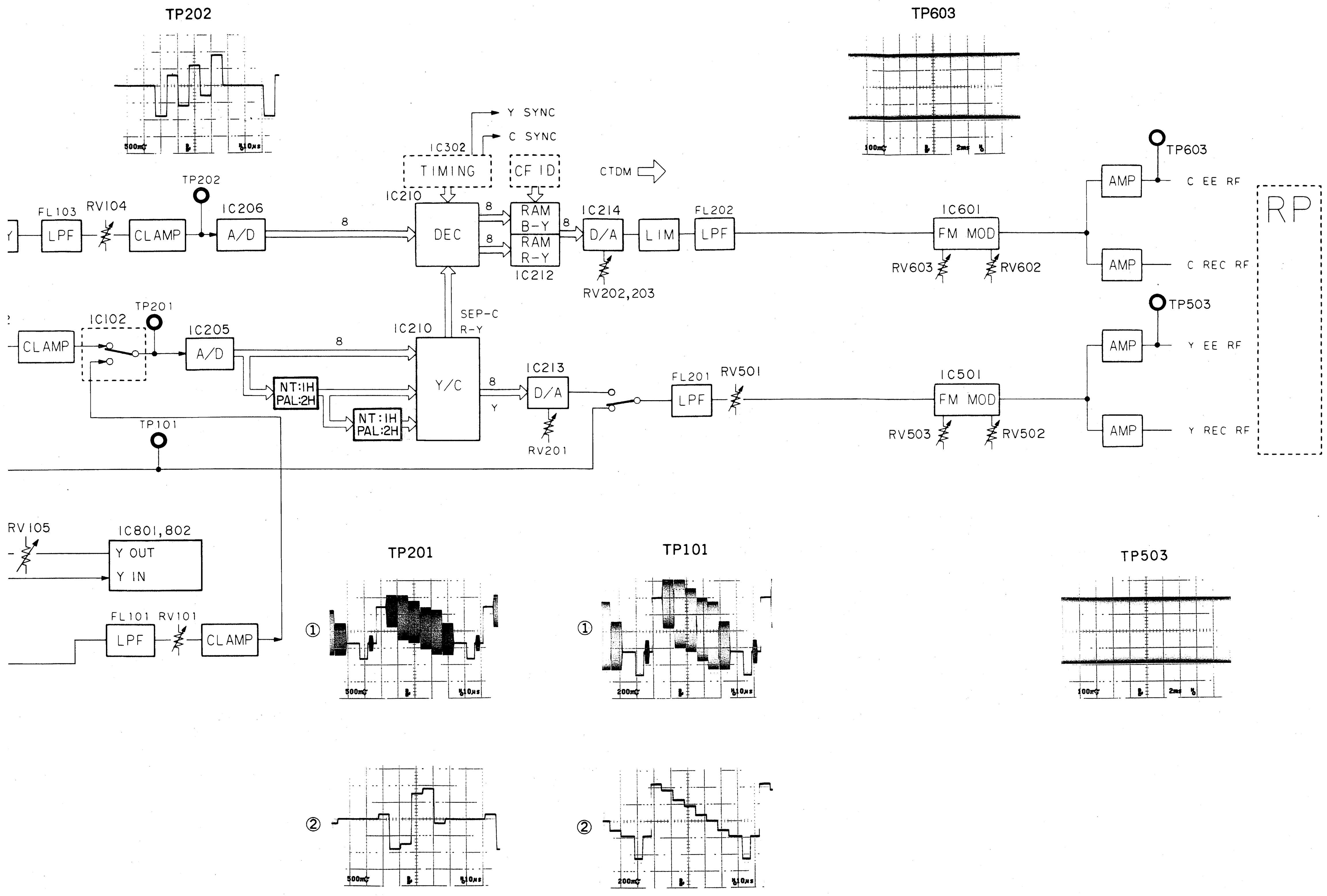
VP board Block Diagram


RP
VP
CP
TP201
TP401
Y R/P(A/B)
HEAD
C R/P(A/B)
HEAD
PRE AMP
LPF
RF EQ
COS EQ
IC202
IC401
F/V
DEM
DEEMPHA NOICAN
RV101 RV102
RV201
RV103
DO DET
Y-DO
RV301
RV302
RV401
RV303
C-DO
TBC-28
G SYNC
Y
SYNC
R-Y
B-Y
CLAMP
G SYNC MUTE
SYNC MIX
RV504
RV506
RV508
RV509
RV511
Y/C MIX
RV501
RV510
RV512
CHARA MIX
CHARA SIG
(SS-61)
RV607
RV502
RV505
RV507
BAL MOD
RV503
RV603
RV602
RV605
RV606
DELAY
RV701
RV702
RV705
RV707
RV709
RV703
RV706
RV708
RV710
RV704
SYNC DRIVER
SYNC OUT
S-VIDEO OUT
Y/G OUT
VIDEO OUT 1
VIDEO OUT 2
R-Y/R OUT
B-Y/B OUT

VRA board Block Diagram


TP202
500mV
10μs
TP603
100mV
2ms
INPUT
COMPONENT
B-Y
R-Y
Y
S-VIDEO
S-C
S-Y
COMPOSITE
VIDEO IN
B-Y
RGB
RV703
R-Y
RGB
RV702
RGB
RV701
IC701
RV103
DELAY
FL103
LPF
RV104
CLAMP
TP202
IC206
A/D
8
IC302
TIMING
Y SYNC
C SYNC
CF ID
CTDM
IC210
DEC
8
RAM B-Y
RAM R-Y
IC212
8
IC214
D/A
RV202,203
LIM
FL202
LPF
IC60
FM M
RV603
FL102
LPF
RV102
CLAMP
IC102
TP201
IC205
A/D
8
IC210
SEP-C
R-Y
Y/C
NT:1H PAL:2H
NT:1H PAL:2H
8
Y
IC213
D/A
RV201
FL201
LPF
RV501
IC50
FM M
RV503
IC101
TP101
RV105
IC801,802
Y OUT
Y IN
IC101
IC101
FL101
LPF
RV101
CLAMP
TP201
①
500mV
10μs
②
500mV
10μs
TP101
①
200mV
10μs
②
200mV
10μs

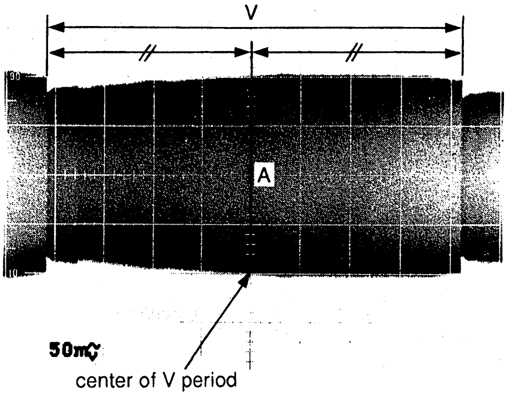
12.15


TP202
500mV
10μs
TP603
100mV
2ms
Y SYNC
C SYNC
IC302
TIMING
CF ID
CTDM
IC210
DEC
RAM
B-Y
RAM
R-Y
IC212
8
IC214
D/A
LIM
FL202
LPF
IC601
FM MOD
RV603
RV602
RV202,203
AMP
TP603
C EE RF
AMP
C REC RF
RP
TP503
AMP
Y EE RF
AMP
Y REC RF
IC501
FM MOD
RV503
RV502
FL103
RV104
LPF
CLAMP
TP202
IC206
A/D
TP201
IC102
CLAMP
IC205
A/D
IC210
SEP-C
R-Y
Y/C
NT:1H
PAL:2H
NT:1H
PAL:2H
IC213
D/A
Y
RV201
FL201
RV501
LPF
TP101
RV105
IC801,802
Y OUT
Y IN
FL101
RV101
LPF
CLAMP
TP201
①
②
500mV
10μs
TP101
①
②
200mV
10μs
TP503
100mV
2ms

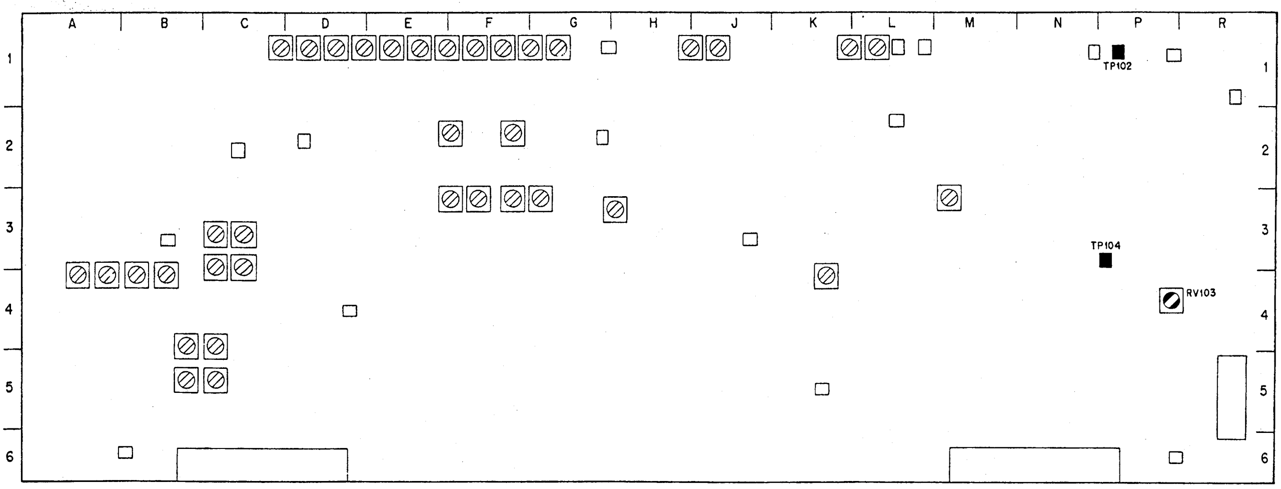
REC system
Input : 100 % Color bars (PAL)
75 % Color bars (NTSC)
① : Composite signal input only
② : Component signal input only
no marking : ① and ②

12-1. VP BOARD (RF, DM SYSTEM) ADJUSTMENT

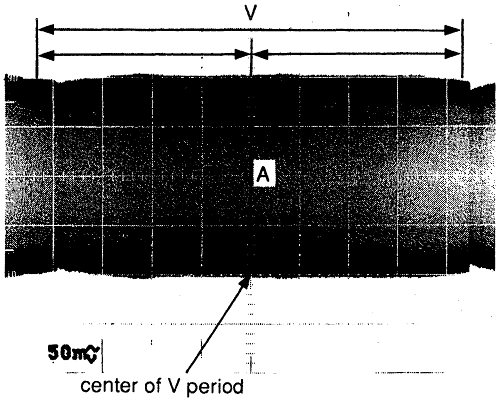
12-1-1. Y PB RF Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) CONNECTION 1	TP104 / VP-44 (P-3) ⊘ **RV103** / VP-44 (P-4) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.20 ± 0.01 V**

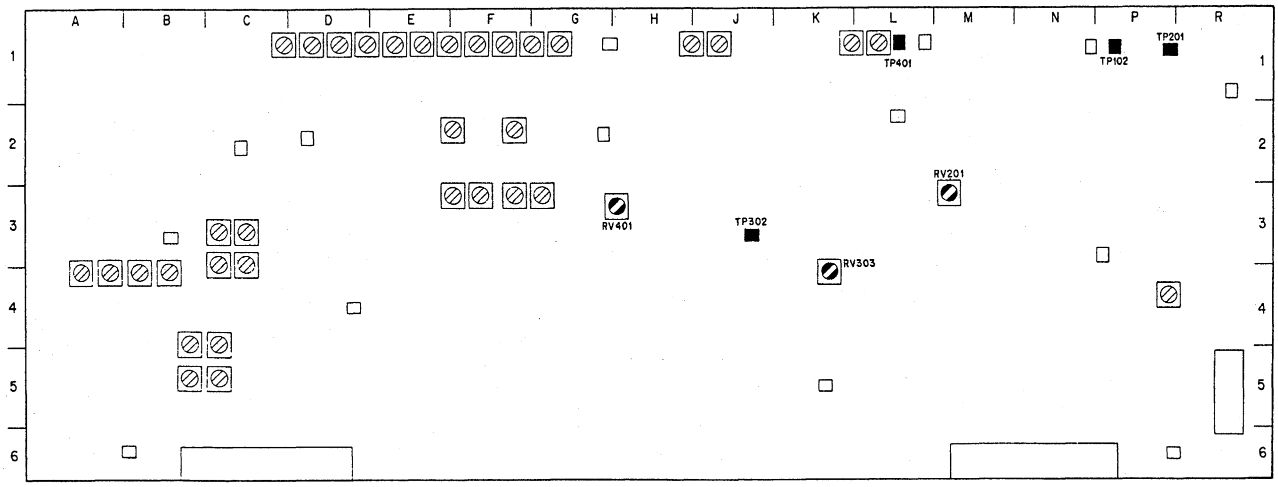
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP102
TP104
RV103

12-1-2. C PB RF Level Adjustment

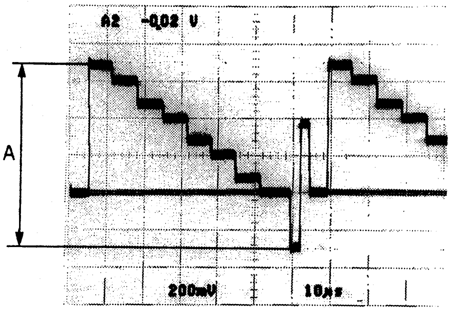
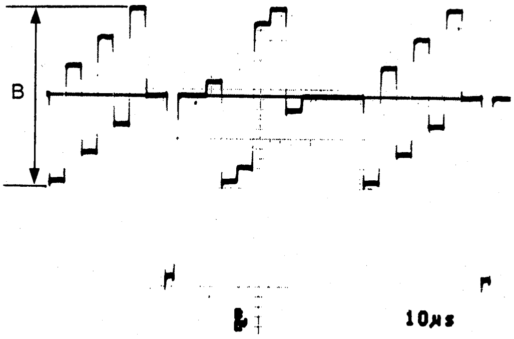
Conditions for adjustment	Adjustment point • Specifications
• PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) CONNECTION 1	TP302 / VP-44 (J-3) ⊘ **RV303** / VP-44 (K-4) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.20 ± 0.01 V**

VP-44 board (A side)

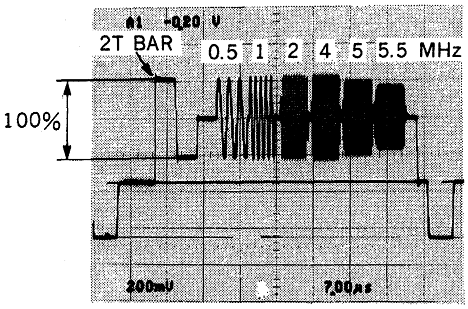


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP401
TP102
TP201
RV201
RV401
TP302
RV303

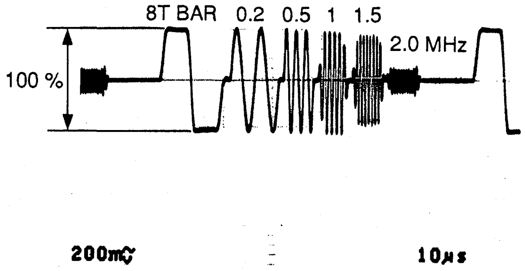
12-1-3. Y and C Demodulator Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00)	(A) Y DM LEVEL TP201 / VP-44 (P-1) ⊘ **RV201** / VP-44 (M-3) TRIG : TP201 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.8 ± 0.02 V**
CONNECTION 1	(B) C DM LEVEL TP401 / VP-44 (L-1) ⊘ **RV401** / VP-44 (H-3) TRIG : TP401 / VP-44 (L-1) Oscilloscope  Spec. **B = 0.933 ± 0.02 V**

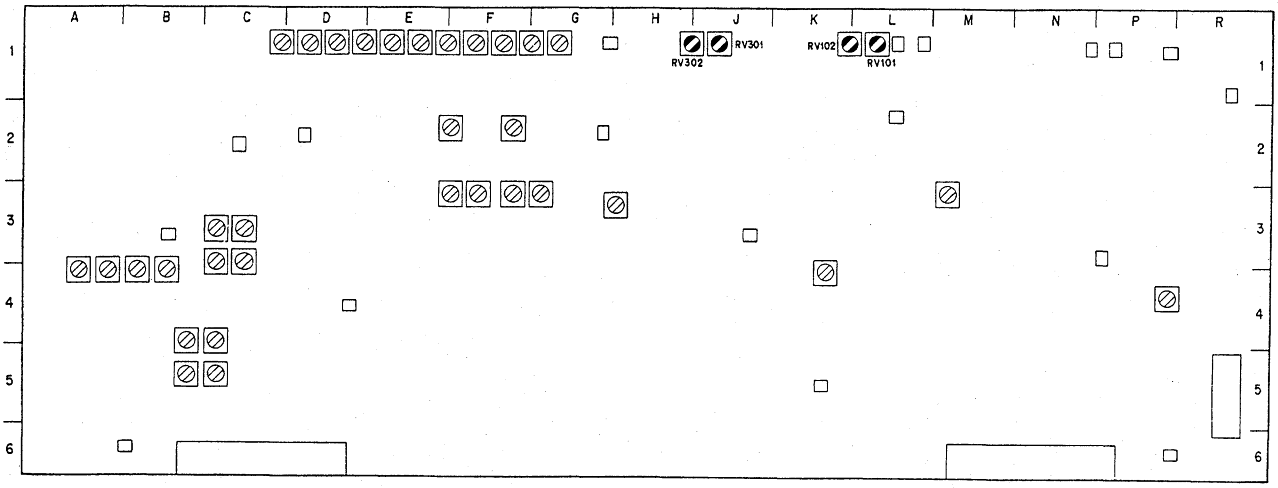
12-1-4. PB Y Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Multi burst signal / CR5-1B PS (8 : 00 – 11 : 00) CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) A ch ⊘ **RV101** / VP-44 (L-1) B ch ⊘ **RV102** / VP-44 (K-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) 2T BAR reference 100 % (or 0 dB) **4 MHz = 98 % (100 thru 96 %) (– 0.8 ± 0.3 dB)** (2) Check the levels for following frequencies. **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 97 % (104 thru 90 %) (– 0.3 ± 0.6 dB)** **2 MHz = 94 % (101 thru 88 %) (– 0.5 ± 0.6 dB)** **5 MHz = 79 % (94 thru 67 %) (– 2 ± 1.5 dB)** (3) Flicker should not be on the monitor picture.

12-1-5. PB C Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Multi burst signal / CR5-1B PS (8 : 00 – 11 : 00) CONNECTION 1	RGB / COMPONENT R / R-Y, B / B-Y OUT (75 Ω terminated) A ch **⊘ RV301** / VP-44 (J-1) B ch **⊘ RV302** / VP-44 (H-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) R / R-Y 8T BAR reference 100 % (or 0 dB) **1.0 MHz = 97 % (99 thru 94 %) (– 0.3 ± 0.2 dB)** (2) Check the levels for following frequencies. **0.2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1.5 MHz = 87 % (93 thru 78 %) ($-1.2\,^{+0.6}_{-1.0}$ dB)** (3) Check that the waveform of B / B-Y satisfies the specifications above. When specification is not satisfied, perform fine adjustments so that both waveforms of R / R-Y and B / B-Y satisfy the specification.

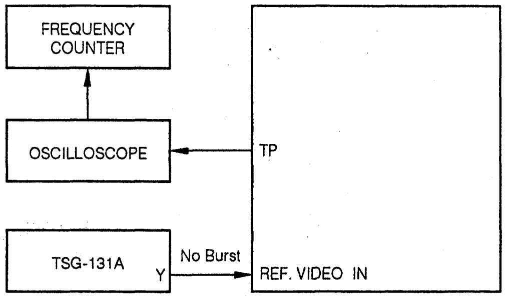
VP-44 board (A side)



12-2. TBC BOARD ADJUSTMENT

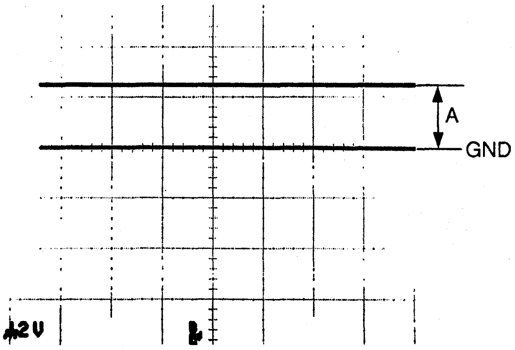
12-2-1. INT SC Frequency Adjustment

[CONNECTION]

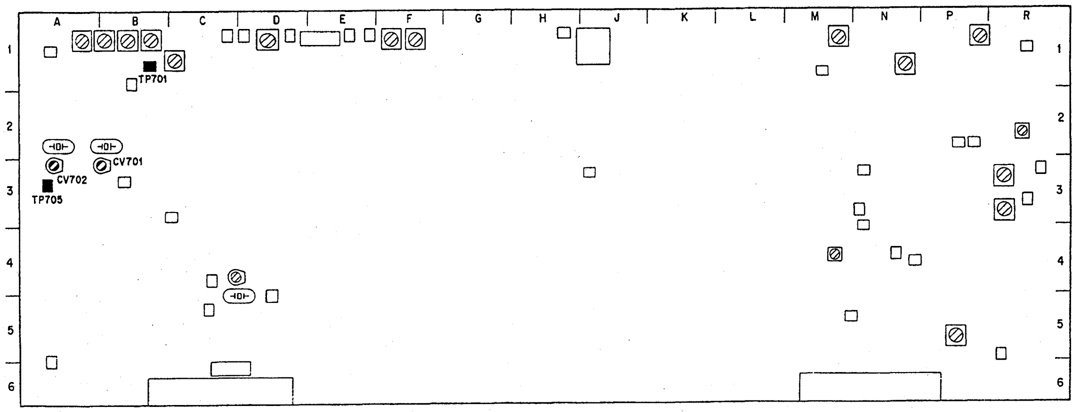

FREQUENCY COUNTER
OSCILLOSCOPE
TP
TSG-131A
Y
No Burst
REF. VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
• EE mode • REF. VIDEO INPUT ; B/W REF	INT SC FREQ TP701 / TBC-28 (B-1) ⊘ **CV701** / TBC-28 (B-3) Frequency counter Spec. **f = 4,433,618 ± 10 Hz**

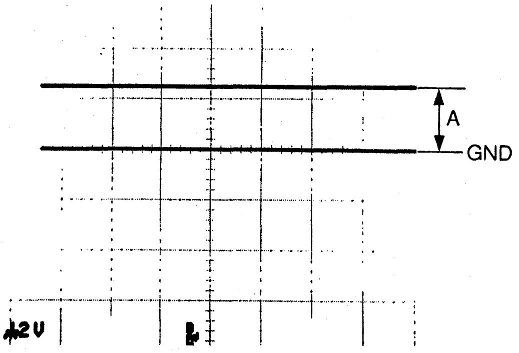
12-2-2. HCK 1 Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode CONNECTION 1	HCK 1 ERROR VOLT TP705 / TBC-28 (A-3) ⊘ **CV702** / TBC-28 (A-3) Oscilloscope  Spec. **A = + 2.50 ± 0.05 Vdc**

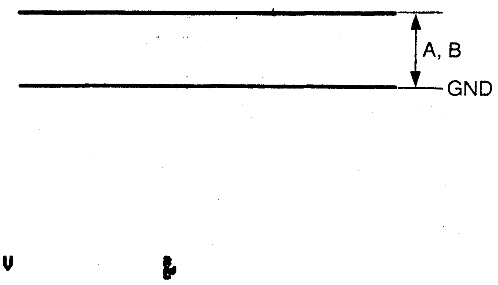
TBC-28 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP701
CV701
CV702
TP705

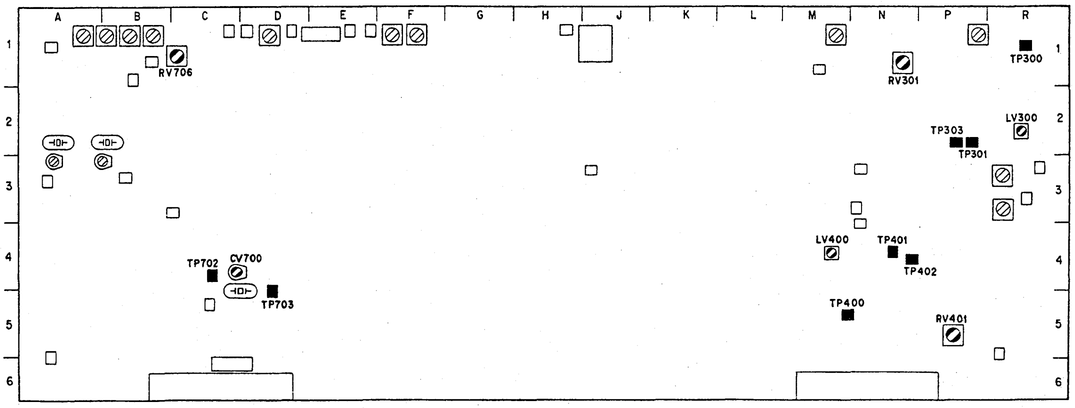
12-2-3. HCK Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode CONNECTION 1	TP702 / TBC-28 (C-4) ⊘ **CV700** / TBC-28 (C-4) Oscilloscope  Spec. **A = + 2.50 ± 0.05 Vdc**

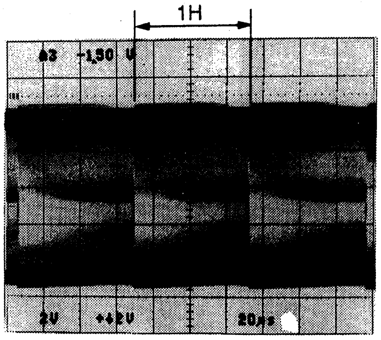
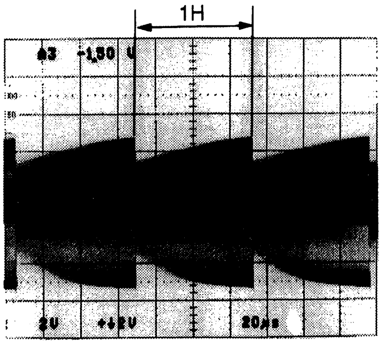
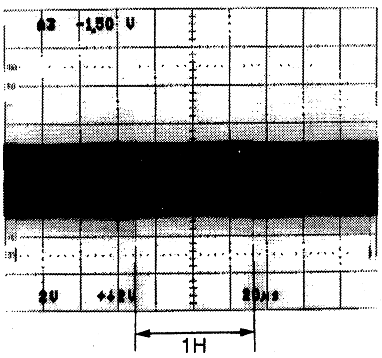
12-2-4. Y and C Normal VCO Adjustment

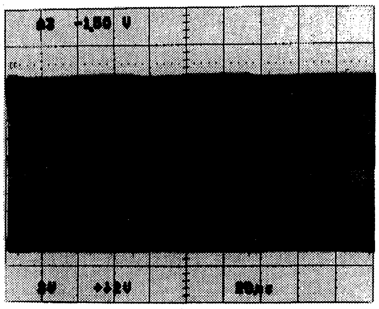
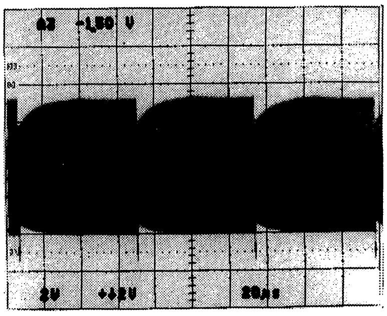
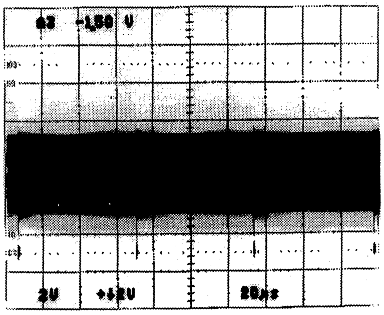
Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 1	(A) Y ERR VOLT TP301 / TBC-28 (P-2) ⊘ **LV300** / TBC-28 (R-2) (B) C ERR VOLT TP401 / TBC-28 (N-4) ⊘ **LV400** / TBC-28 (M-4) Oscilloscope  Spec. **A = B = + 2.80 ± 0.05 Vdc**

TBC-28 board (A side) **APPLICATION : 12-2-3 to 5.**

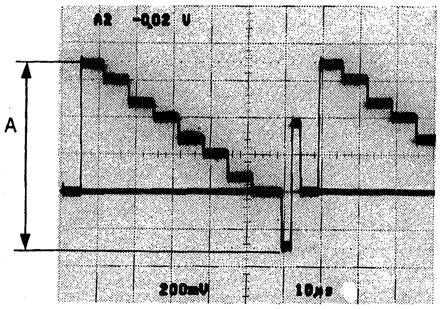
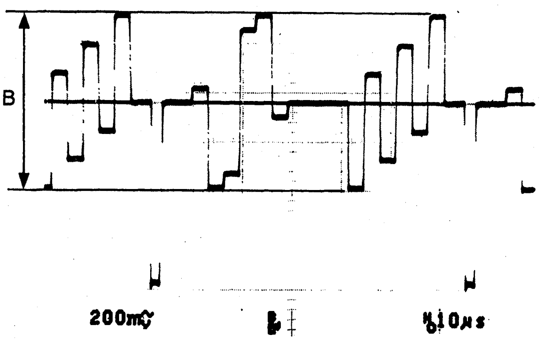

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV706
RV301
TP300
LV300
TP303
TP301
TP702
CV700
TP703
LV400
TP401
TP402
TP400
RV401

12-2-5. Y and C WCK Frequency Adjustment

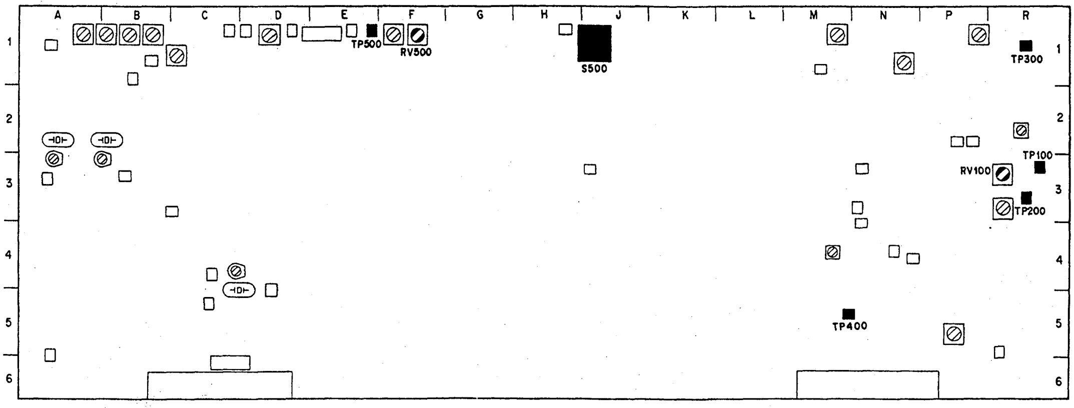
Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; 100 % Color bar CONNECTION 1	Y WCK (A) Phase adjustment CH-1 : TP703 / TBC-28 (D-4) CH-2 : TP303 / TBC-28 (P-2) ⊘ **RV706** / TBC-28 (C-1) (B) Frequency adjustment CH-1 : TP703 / TBC-28 (D-4) CH-2 : TP303 / TBC-28 (P-2) ⊘ **RV301** / TBC-28 (N-1) TRIG : TP300 / TBC-28 (R-1) Oscilloscope CH-1 and CH-2 (INVERT) ADD waveform  Fig. A ⇩ (A)  Fig. B ⇩ (B)  Fig. C Spec. (A) Make smaller the amplitude and let appear several lateral stripes clearly, as shown in the progress to Fig. B from Fig. A, by RV706. (B) Equalize the frequency of CH-2 to CH-1 with RV301 as shown in Fig. C. (When the lateral stripes become straight lines, the both frequencies are equal.)

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; 100 % Color bar CONNECTION 1	C WCK (A) Phase adjustment CH-1 : TP703 / TBC-28 (D-4) CH-2 : TP402 / TBC-28 (N-4) ⊘ **RV706** / TBC-28 (C-1) (B) Frequency adjustment CH-1 : TP703 / TBC-28 (D-4) CH-2 : TP402 / TBC-28 (N-4) ⊘ **RV401** / TBC-28 (P-5) TRIG : TP400 / TBC-28 (M-5) Oscilloscope CH-1 and CH-2 (INVERT) ADD waveform  Fig. A ⇩ (A)  Fig. B ⇩ (B)  Fig. C Spec. (A) Make smaller the amplitude and let appear several lateral stripes clearly, as shown in the progress to Fig. B from Fig. A, by RV706. (B) Equalize the frequency of CH-2 to CH-1 with RV401 as shown in Fig. C. (When the lateral stripes become straight lines, the both frequencies are equal.)

12-2-6. Y and C TBC Input Level Check

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00)	(A) Y IN TP100 / TBC-28 (R-3) TRIG : TP300 / TBC-28 (R-1) Oscilloscope  Spec. **A = 0.8 ± 0.1 V**
CONNECTION 1	(B) C IN TP200 / TBC-28 (R-3) TRIG : TP400 / TBC-28 (M-5) Oscilloscope  Spec. **B = 0.933 ± 0.1 V**

TBC-28 board (A side)



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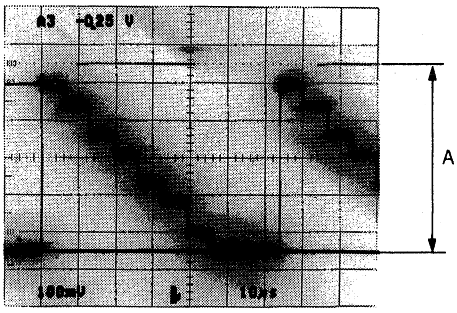
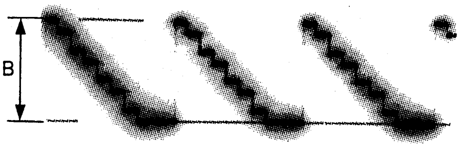
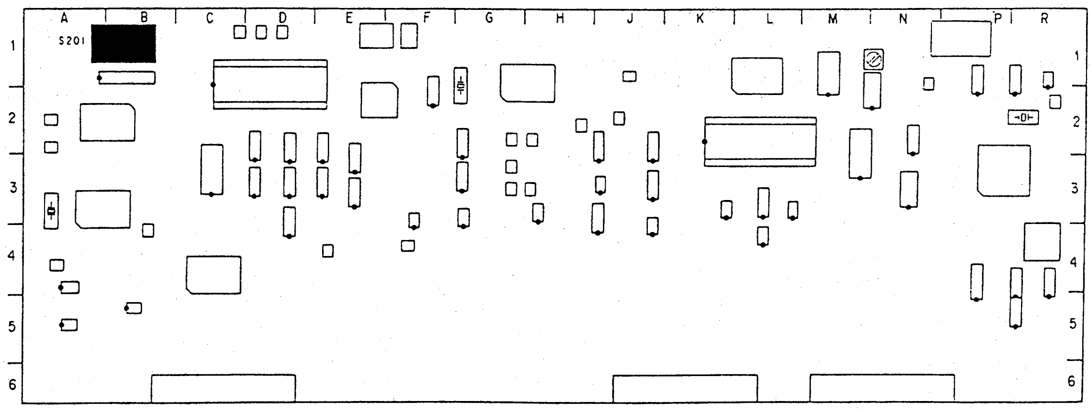
TP500
RV500
S500
TP300
TP100
RV100
TP200
TP400

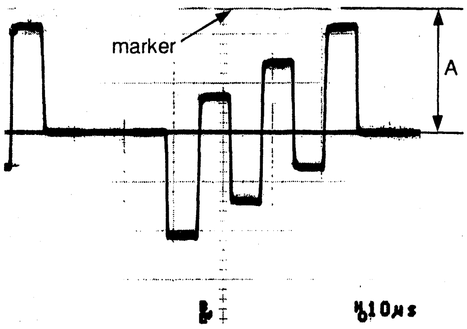
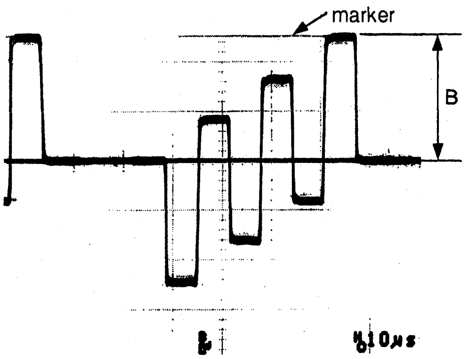
12-2-7. Y TBC Output and Gain Adjustment

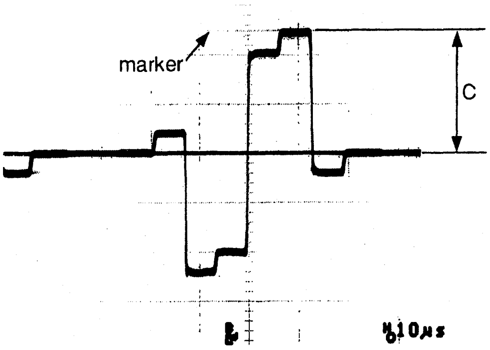
Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • S201-1 (MAINTENANCE MODE) / SS-61 (B-1) ; CLOSE (ON) • S500-1 (LEVEL REF) / TBC-28 (J-1) ; CLOSE (ON)	Step 1 (A) VIDEO LEVEL TP500 / TBC-28 (E-1) ⊘ **RV500** / TBC-28 (F-1) TRIG : VIDEO OUT Oscilloscope  Spec. **A = 0.50 ± 0.01 V**
• After adjustment is completed, set S201-1 / SS-61 and S500-1 / TBC-28 to OFF. CONNECTION 1	Step 2 (B) Y GAIN TP500 / TBC-28 (E-1) ⊘ **RV100** / TBC-28 (R-3) TRIG : VIDEO OUT Oscilloscope  Spec. Set the B level to marker (Ref. **B = 0.50 ± 0.01 V**)

SS-61 board (A side)

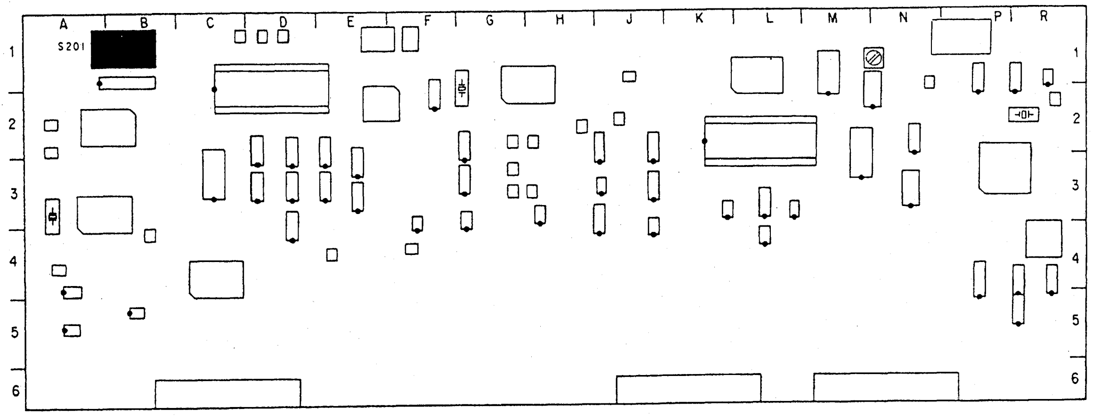


12-2-8. C TBC Output and Gain Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • S201-1 (MAINTENANCE MODE) / SS-61 (B-1) ; CLOSE (ON) • S500-1 (LEVEL REF) / TBC-28 (J-1) ; CLOSE (ON) CONNECTION 1	Step 1 (A) CHROMA LEVEL TP501 / TBC-28 (E-1) ⊘ **RV501** / TBC-28 (F-1) TRIG : VIDEO OUT Oscilloscope  Spec. A = **0.333 ± 0.01** V
	Step 2 (B) C GAIN TP501 / TBC-28 (E-1) ⊘ **RV200** / TBC-28 (R-3) TRIG : VIDEO OUT Oscilloscope  Spec. Set the B level to marker (Ref. **B = 0.333 ± 0.01** V)

Conditions for adjustment	**Adjustment point • Specifications**
- PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) - S201-1 (MAINTENANCE MODE) / SS-61 (B-1) ; CLOSE (ON) - S500-1 (LEVEL REF) / TBC-28 (J-1) ; CLOSE (ON) - After adjustment is completed, set S201-1 / SS-61 and S500-1 / TBC-28 to OFF. CONNECTION 1	Step 3 (C) CHROMA LEVEL TP502 / TBC-28 (D-1) ⊘ **RV502** / TBC-28 (D-1) TRIG : VIDEO OUT Oscilloscope  Spec. C = **0.333 ± 0.01 V**

SS-61 board (A side)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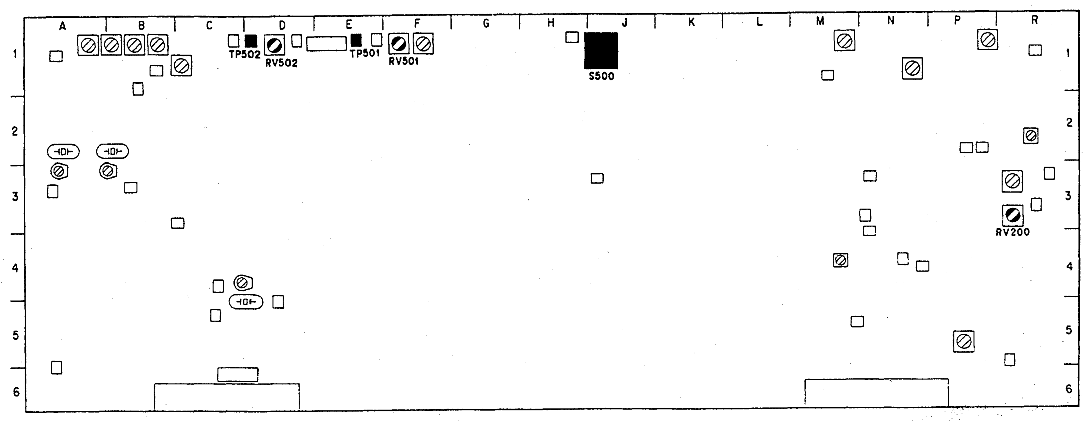
S201

TBC-28 board (A side)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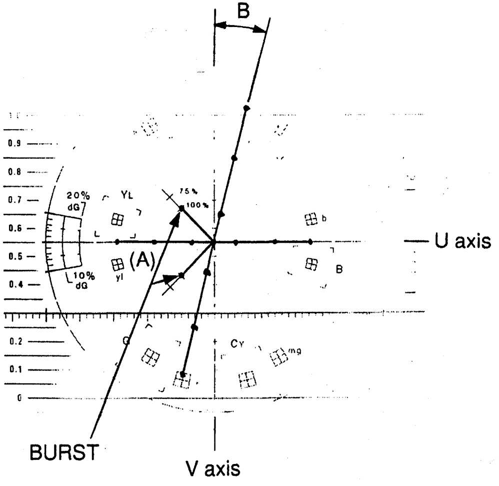
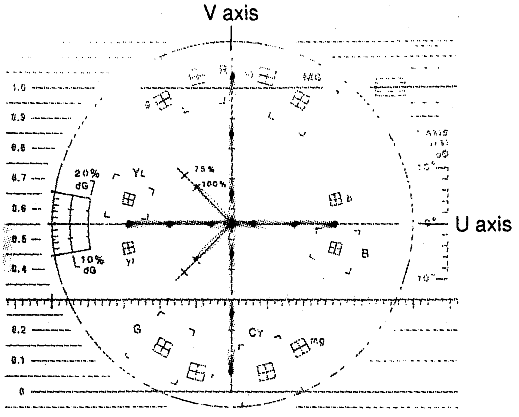
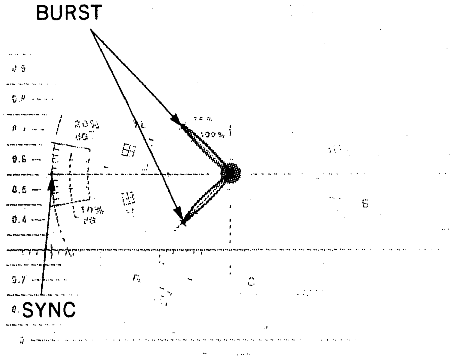
TP502
RV502
TP501
RV501
S500
RV200

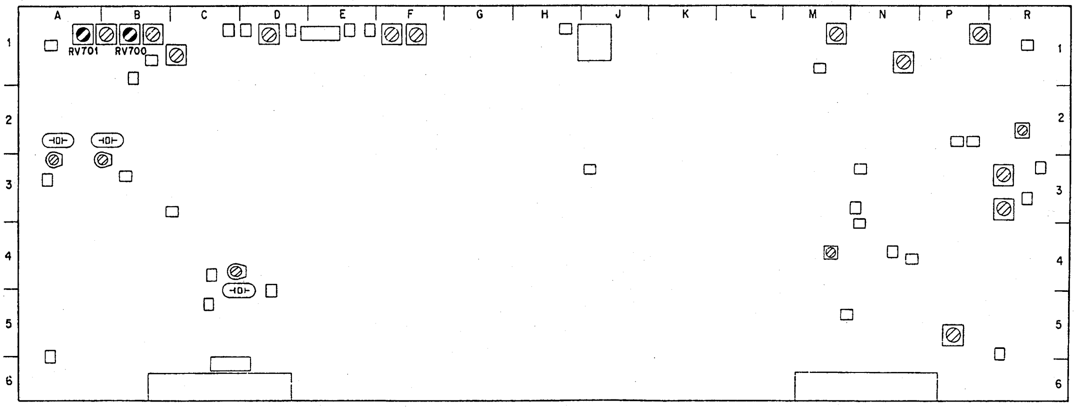
12-2-9. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Quad phase / CR5-1B PS (22 : 00 – 24 : 00) CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst ⊘ **PHASE control** / Vector (B) V axis (U / V OFFSET) ⊘ **RV700** / TBC-28 (B-1) TRIG : REF. VIDEO Vector Before adjustment  B U axis (A) 20% dG 10% dG YL 75% 100% CY BURST V axis After adjustment  V axis U axis 20% dG 10% dG YL 75% 100% CY Spec. (A) Set the dot of the burst on the right position on the scale. (B) Set the dots of the R-Y on the V axis of the vector. **B = 0 ± 1 °**

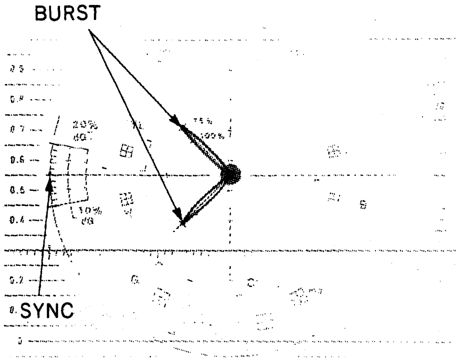
12-2-10. PB INT SCH Phase Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode • 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • REF. VIDEO INPUT ; No signal • Waveform Vector (1751) ; SCH mode	VIDEO OUT 1 (75 Ω terminated) (A) Burst Adjustment ⊘ **PHASE control** / Vector (B) INT SC ⊘ **RV701** / TBC-28 (A-1) TRIG : INT / WFM SCH mode 
• After adjustment is completed, connect the REF. VIDEO INPUT. CONNECTION 2	Spec. (A) Set the dot of the burst on the normal position on the scale. (B) The SYNC should be in the center of the burst (SCH = 0°).

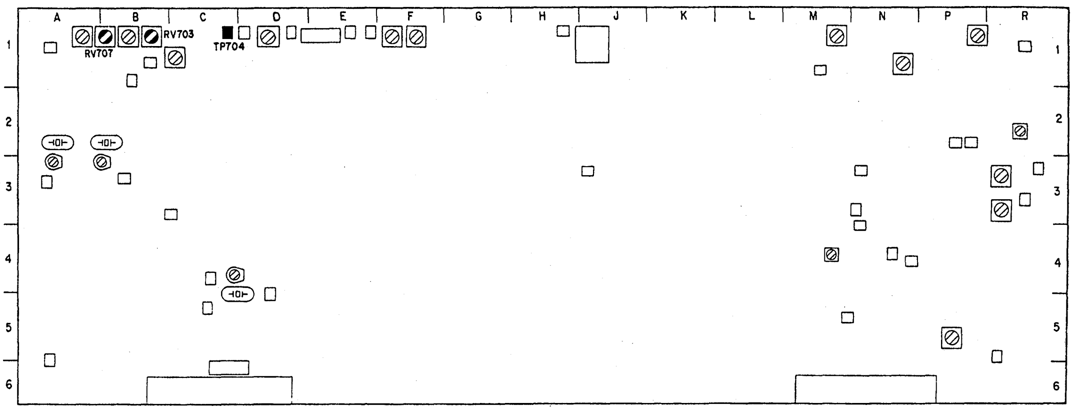
TBC-28 board (A side)



12-2-11. SC Phase Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • EE mode • Waveform Vector (1751) ; SCH mode CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst Adjustment ⊘ **PHASE control** / Vector (B) SC ⊘ **RV707** / TBC-28 (B-1) TRIG : INT / WFM SCH mode  Spec. (A) Set the dot of the burst on the normal position on the scale. (B) The SYNC should be in the center of the burst (SCH = 0°).

TBC-28 board (A side)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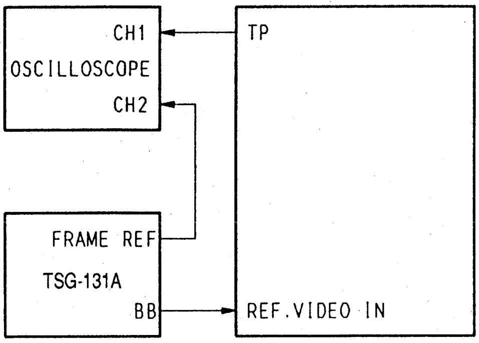
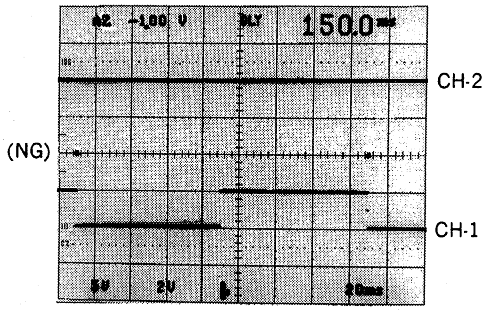
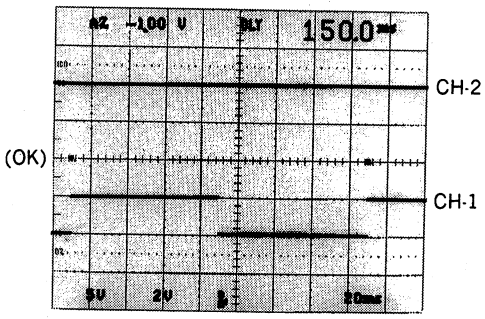
RV703
RV707
TP704

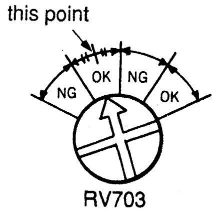
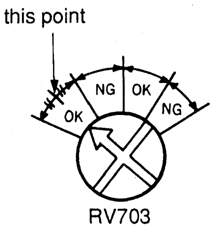
12-2-12. Reference CF Phase Adjustment

[CONNECTION]

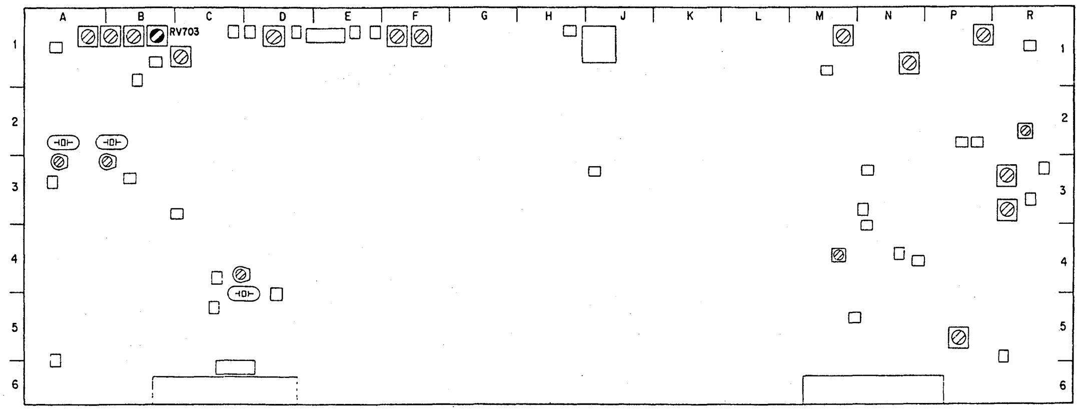

CH1
OSCILLOSCOPE
CH2
TP
FRAME REF
TSG-131A
BB
REF.VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • EE mode	CH-1 / Oscilloscope TP704 / TBC-28 (C-1) ⊘ **RV703** / TBC-28 (B-1) CH-2 / Oscilloscope FRAME PULSE / TSG-131A TRIG : FRAME PULSE (CH-2) Oscilloscope  ⇩ 

Continues to the next page.

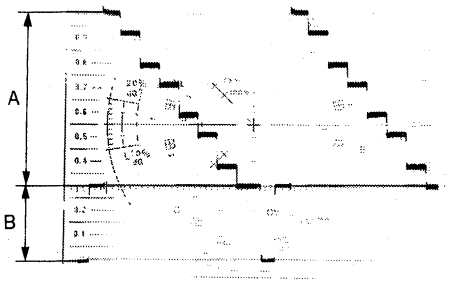
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • EE mode	Spec. (1) Turn RV703 counterclockwise fully. (2) When RV703 is turned clockwise gradually, the phase condition between CH-1 and CH-2 changes from NG to OK or OK to NG. (3) In case of the pattern of change is started from NG as shown in the following illustration, set RV703 to mechanical center of range of first OK. NG → OK → NG → OK ↑ the mechanical center of this range  this point (4) In case of the pattern of change is started from OK as shown in the following illustration, set RV703 to mechanical center of range of first OK. OK → NG → OK → NG ↑ the mechanical center of this range  this point * If the range of first OK is extremely narrow, set to mechanical center of range of second OK.

TBC-28 board (A side)

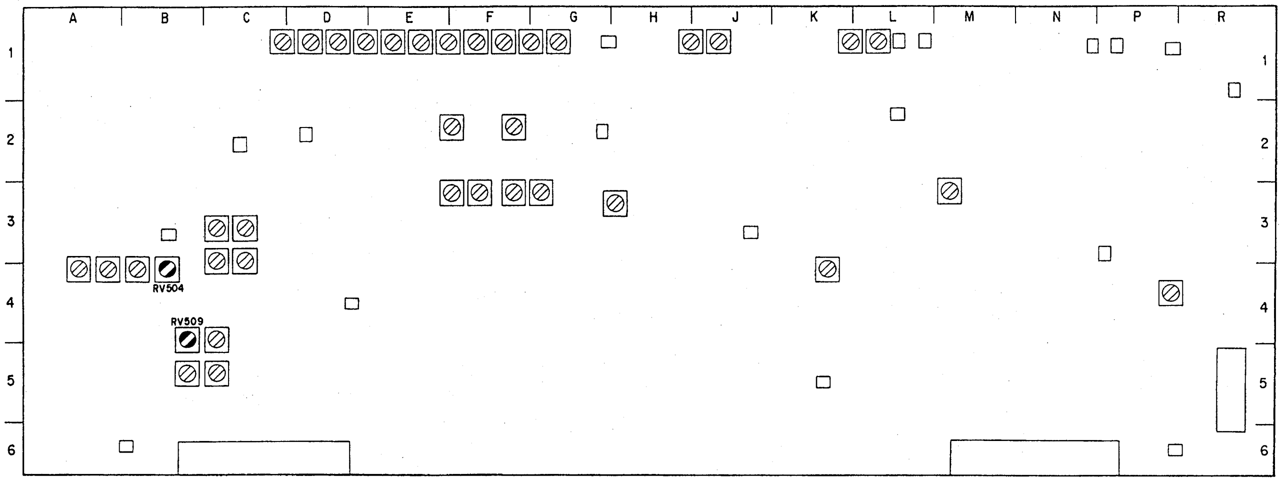


12-3. VP BOARD (VO, EN) ADJUSTMENT

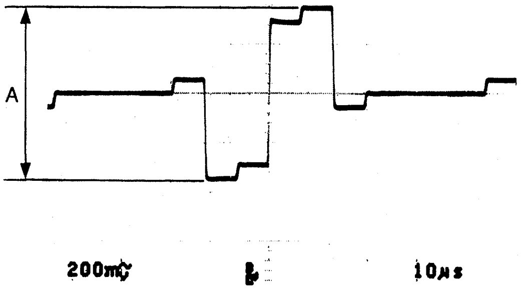
12-3-1. RGB / COMPONENT Y OUT Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) (A) Y LEVEL ⊘ **RV509** / VP-44 (B-4) (B) Y SYNC ⊘ **RV504** / VP-44 (B-4) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V** **B = 0.300 ± 0.007 V**

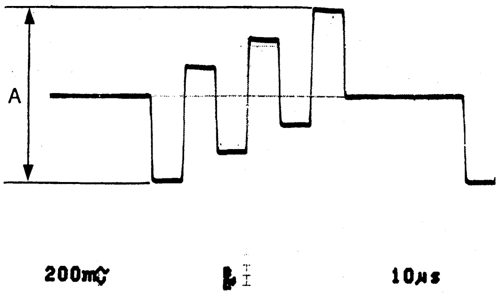
VP-44 board (A side)



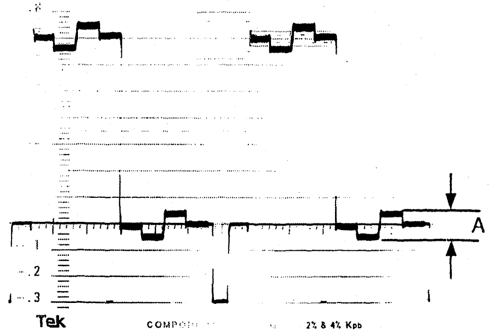
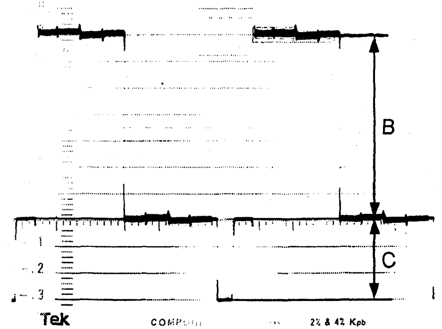
12-3-2. RGB / COMPONENT R-Y OUT Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 1	RGB / COMPONENT R / R-Y OUT (75 Ω terminated) ⊘ **RV703** / VP-44 (F-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V**

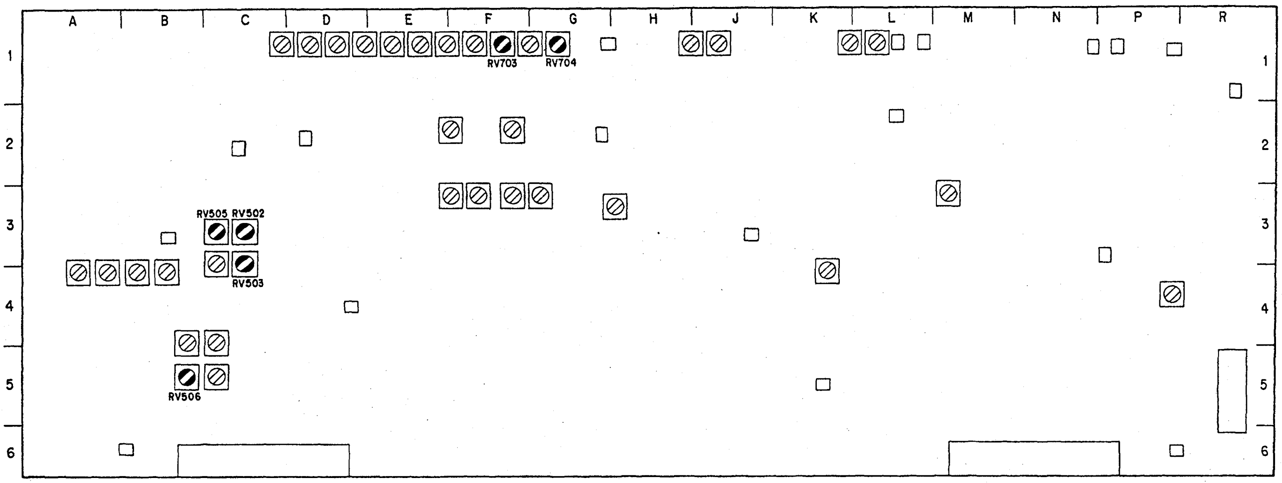
12-3-3. RGB / COMPONENT B-Y OUT Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 1	RGB / COMPONENT B / B-Y OUT (75 Ω terminated) ⊘ **RV704** / VP-44 (G-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V**

12-3-4. PB G Balance / Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) (A) Y BALANCE ⊘ **RV502** / VP-44 (C-3) G BALANCE ⊘ **RV503** / VP-44 (C-3) (B) G LEVEL ⊘ **RV505** / VP-44 (C-3) (C) G SYNC ⊘ **RV506** / VP-44 (B-5) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  After adjustment  Spec. **A = 0 ± 0.01 V** (Adjustment RV502 and RV503 alternately) **B = 0.700 ± 0.014 V** **C = 0.300 ± 0.007 V**

VP-44 board (A side)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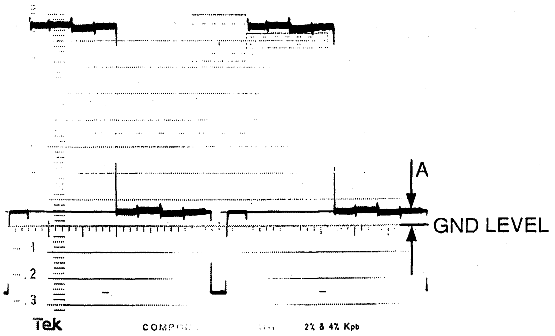
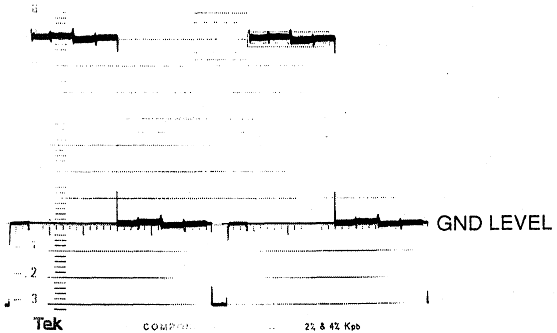
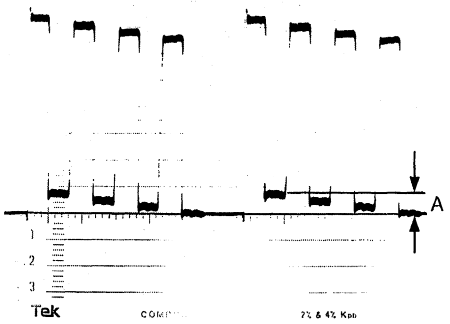
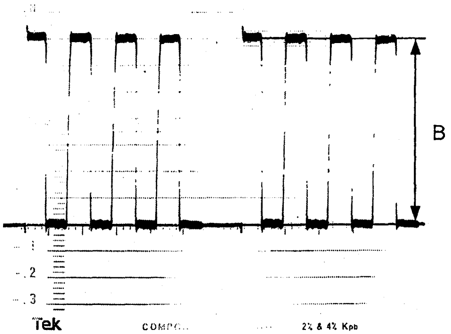
RV703
RV704
RV505
RV502
RV503
RV506

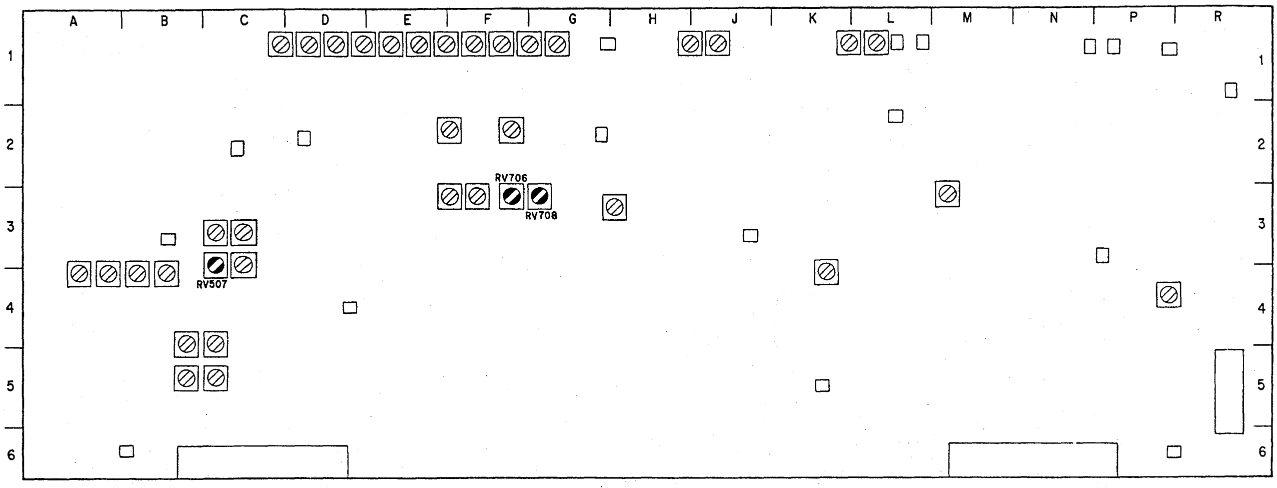
12-3-5. PB G DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV507** / VP-44 (C-3) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  ⇩ After adjustment  Spec. **A = 0 ± 0.01 V**

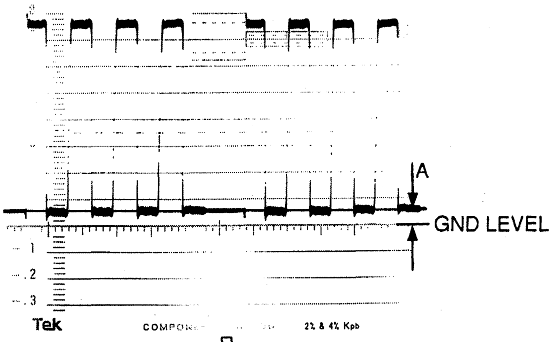
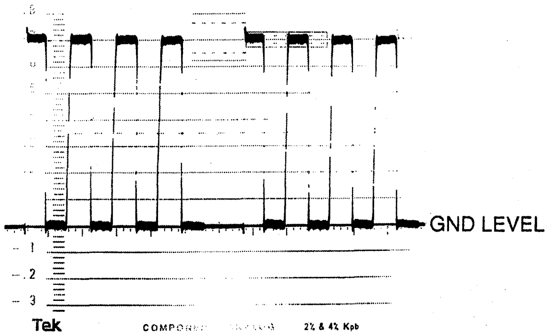
12-3-6. PB B Balance / Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT B / B-Y OUT (75 Ω terminated) (A) B BALANCE ⊘ **RV706** / VP-44 (F-3) (B) B LEVEL ⊘ **RV708** / VP-44 (G-3) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  ⇩ After adjustment  Spec. **A = 0 ± 0.01 V** **B = 0.700 ± 0.014 V**

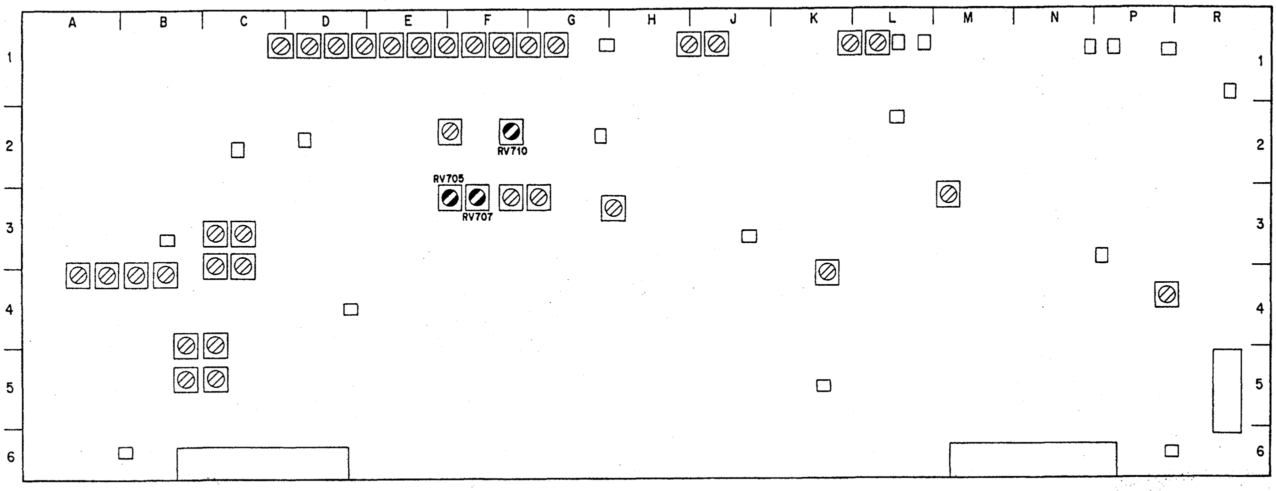
VP-44 board (A side)



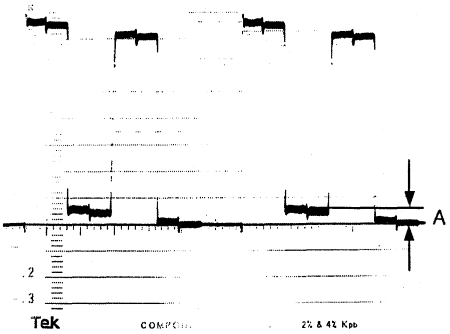
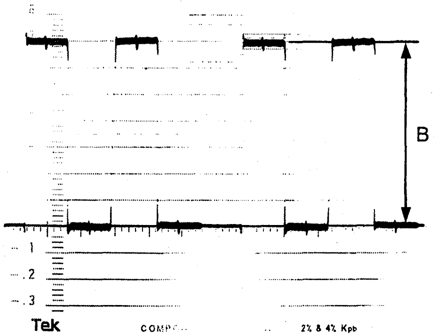
12-3-7. PB B DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT B / B-Y OUT (75 Ω terminated) ⊘ **RV710** / VP-44 (F-2) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  After adjustment  Spec. **A = 0 ± 0.01 V**

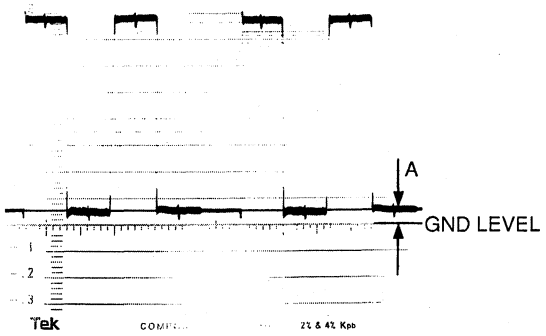
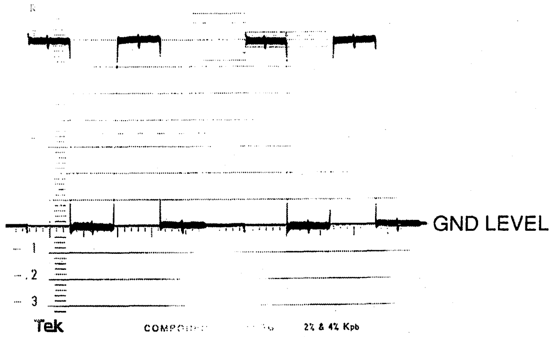
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV710
RV705
RV707

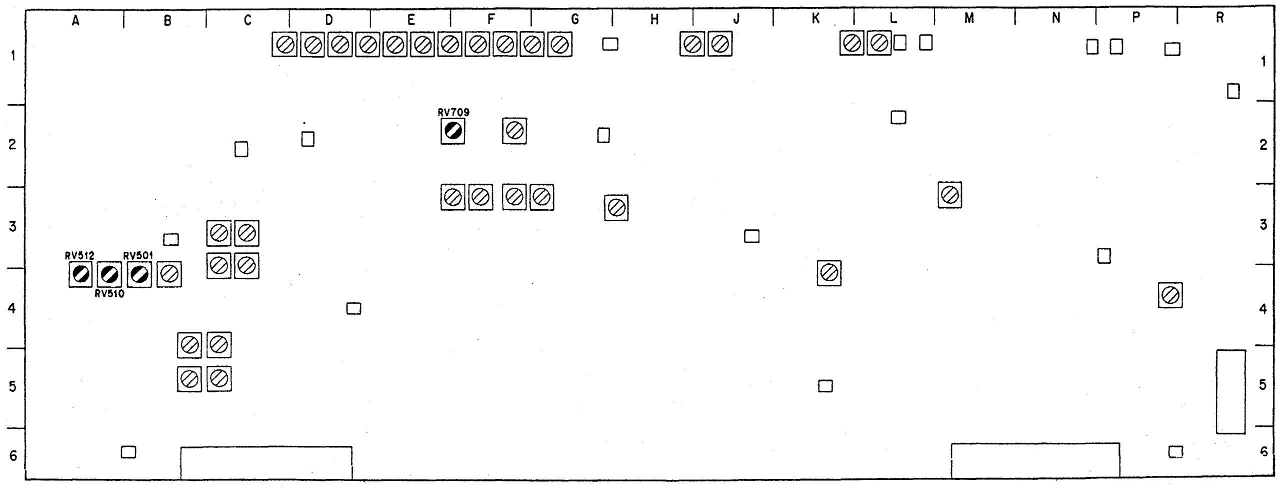
12-3-8. PB R Balance / Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT R / R-Y OUT (75 Ω terminated) (A) R BALANCE **⊘ RV705** / VP-44 (F-3) (B) R LEVEL **⊘ RV707** / VP-44 (F-3) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  ⇩ After adjustment  Spec. **A = 0 ± 0.01 V** **B = 0.700 ± 0.014 V**

12-3-9. PB R DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • COMPONENT OUT switch / Sub control panel ; RGB CONNECTION 1	RGB / COMPONENT R / R-Y OUT (75 Ω terminated) ⊘ **RV709** / VP-44 (F-2) TRIG : REF. VIDEO WFM or Oscilloscope Before adjustment  After adjustment  Spec. **A = 0 ± 0.01 V**

VP-44 board (A side)


A
B
C
D
E
F
G
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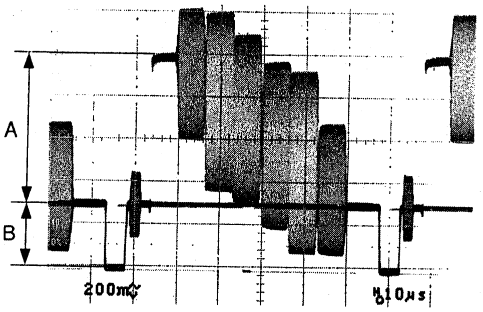
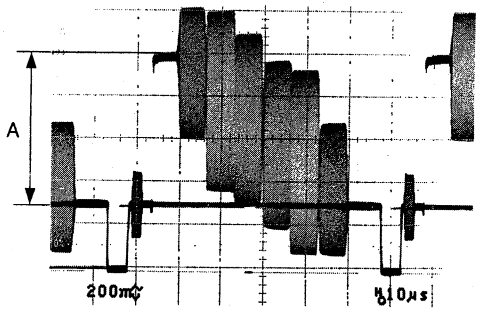
J
K
L
M
N
P
R
1
2
3
4
5
6
RV709
RV512
RV501
RV510

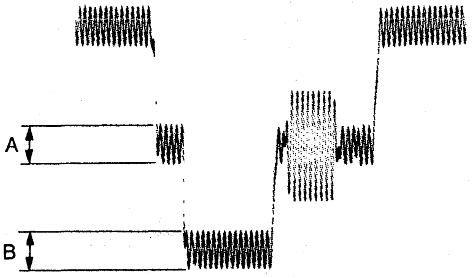
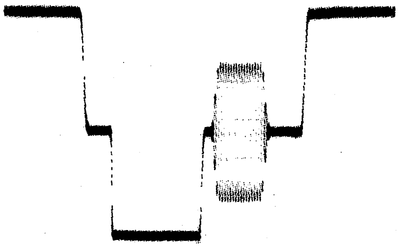
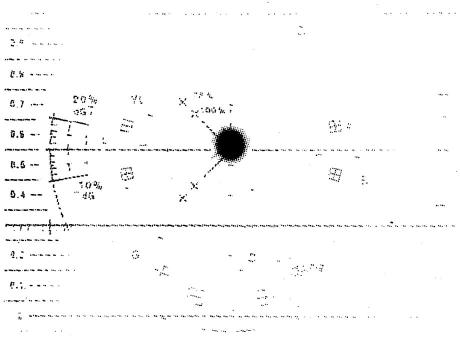
12-3-10. VIDEO OUT 1 Y/SYNC Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) (A) VIDEO 1 ⊘ **RV510** / VP-44 (A-4) (B) VIDEO SYNC ⊘ **RV501** / VP-44 (B-4) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V** **B = 0.300 ± 0.007 V**

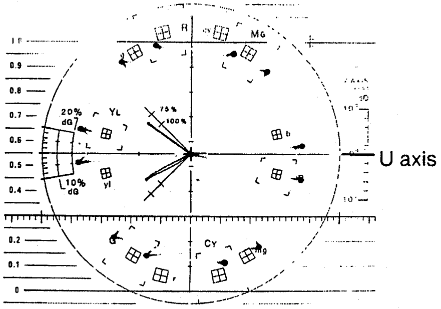
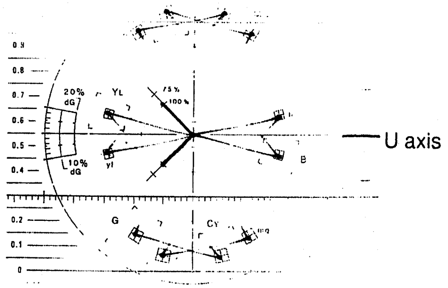
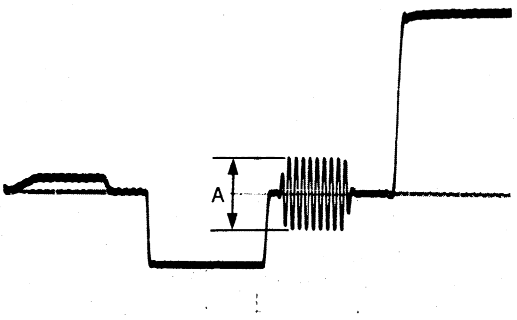
12-3-11. VIDEO OUT 2 Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	VIDEO OUT 2 (75 Ω terminated) ⊘ **RV512** / VP-44 (A-4) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V**

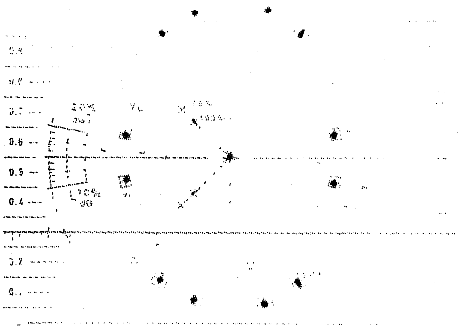
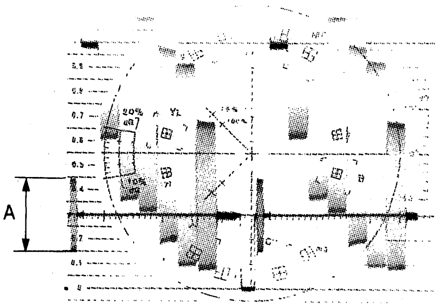
12-3-12. VIDEO OUT 1 ENC SC Leak Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) • Waveform Vector (1751) ; WFM mode • Set the time axis of the WFM to magnification mode CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) (A) U SC LEAK ⊘ **RV603** / VP-44 (E-1) (B) V SC LEAK ⊘ **RV602** / VP-44 (D-1) TRIG : REF. VIDEO WFM mode Before adjustment  ⇩ After adjustment  Spec. Minimize the A, B. **A, B ≦ 7 mV** Adjust alternately.
Step 2 • Do not use the extention board. • PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) • Waveform Vector (1751) ; Vector mode CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO Vector mode  Spec. Maximum the gain of the Vector and check the dot is at center.

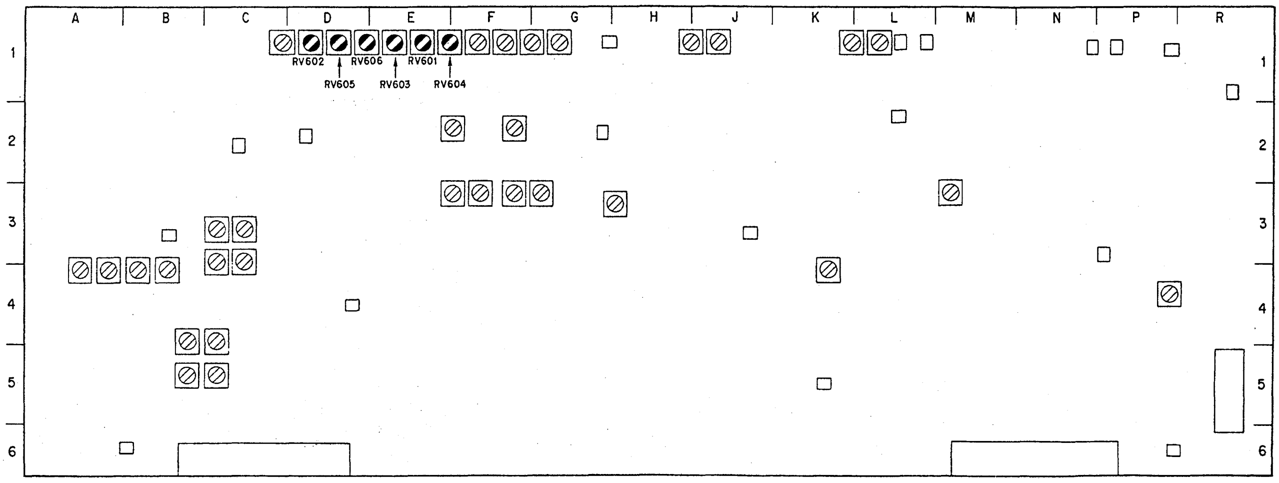
12-3-13. VIDEO OUT 1 C / Burst Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
- Do not use the extention board. - PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00)	Step 1 VIDEO OUT 1 (75 Ω terminated) (A) Burst preset ⊘ **PHASE control** / Vector (B) V axis (ENC R-Y) ⊘ **RV605** / VP-44 (D-1) U axis (ENC B-Y) ⊘ **RV606** / VP-44 (D-1) (C) Burst level / 90° ⊘ **RV601** / VP-44 (E-1) ⊘ **RV604** / VP-44 (E-1) Vector Before adjustment  R MG YL 20% dG 10% dG 75% 100% CY U axis 0.9 0.8 0.7 0.6 0.5 0.4 0.2 0.1 0 After adjustment  YL 20% dG 10% dG 75% 100% G CY B U axis 0.8 0.7 0.6 0.5 0.4 0.2 0.1 0 Spec. (A) Set the two bursts to be symmetrical with regard to the U axis. (B) All dots should be inside the " ⊞ " mark on the vector by adjustment RV605 and RV606 alternately. (C) Set the dot of the two bursts on the right position on the scale.
CONNECTION 2	Step 2 (Check) VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.300 ± 0.007 V**

12-3-14. VIDEO OUT 2 C Level and Burst Level Check

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) Step 1 • Use the Waveform Vector (1751) as a vectorscope, set the dot of the burst on the right position on the scale by PHASE control. CONNECTION 2	VIDEO OUT 2 (75 Ω terminated) TRIG : REF. VIDEO Vector mode  Spec. All dots should be inside the " ⊞ " mark on the Vector.
Step 2 • Waveform Vector (1751) ; WFM mode CONNECTION 2	VIDEO OUT 2 (75 Ω terminated) TRIG : REF. VIDEO WFM mode  Spec. **A = 0.300 ± 0.01 V**

VP-44 board (A side) **APPLICATION : 12-3-12 to 13.**


A
B
C
D
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G
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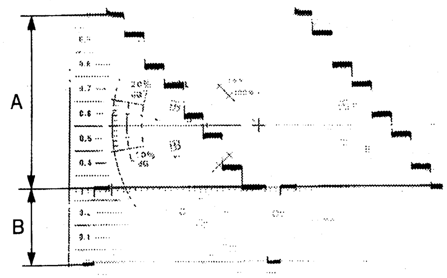
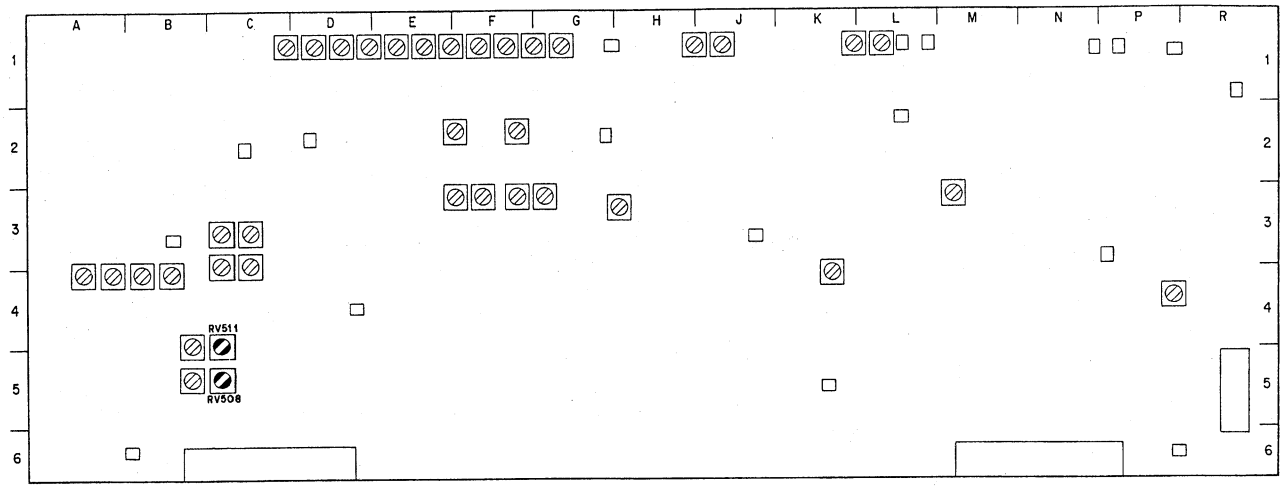
J
K
L
M
N
P
R
1
2
3
4
5
6
RV602
RV606
RV601
RV605
RV603
RV604

12-3-15. S-VIDEO OUT Y / SYNC Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 1	S-VIDEO (Y) OUT (75 Ω terminated) (A) S-Y LEVEL ⊘ **RV511** / VP-44 (C-4) (B) S-SYNC ⊘ **RV508** / VP-44 (C-5) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.014 V** **B = 0.300 ± 0.014 V**

VP-44 board (A side)


A
B
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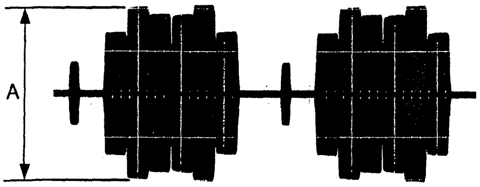
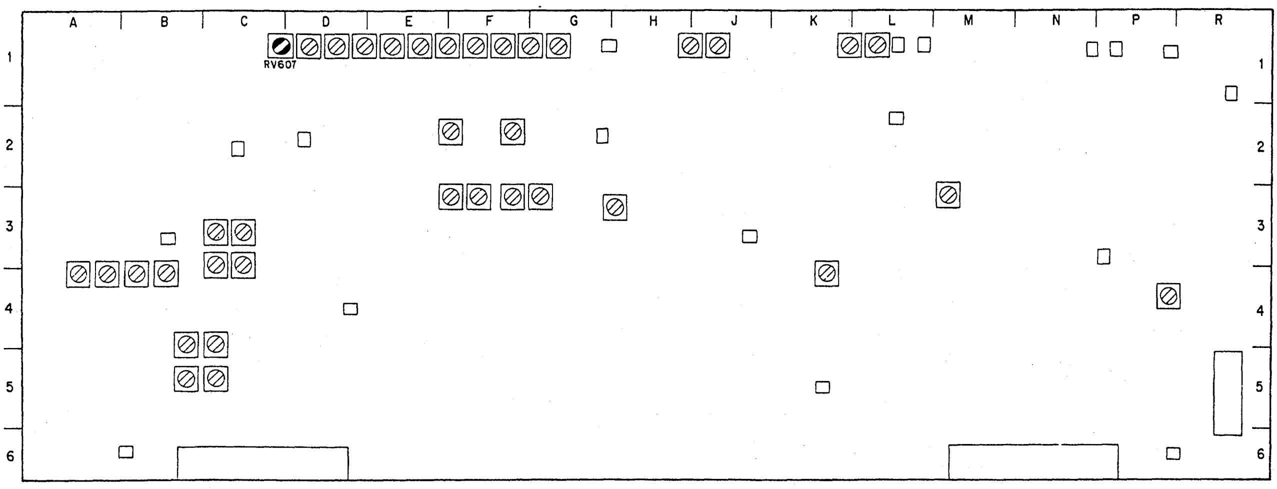
L
M
N
P
R
1
2
3
4
5
6
RV511
RV508

12-3-16. PB S-VIDEO C Level Adjustment

Conditions for adjustment	**Adjustment point • Specifications**
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	S-VIDEO (C) OUT (75 Ω terminated) ⊘ **RV607** / VP-44 (C-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.885 ± 0.01 V**

VP-44 board (A side)

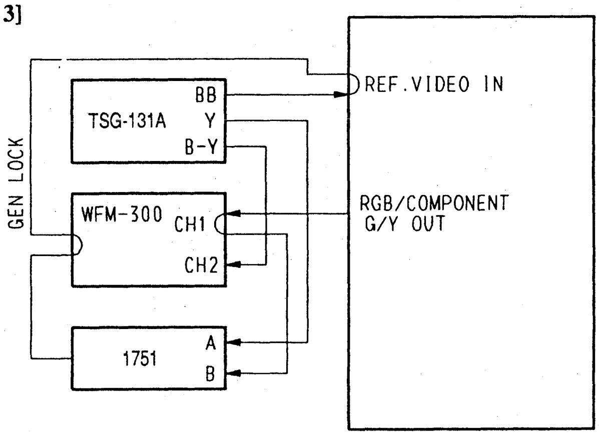

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV607

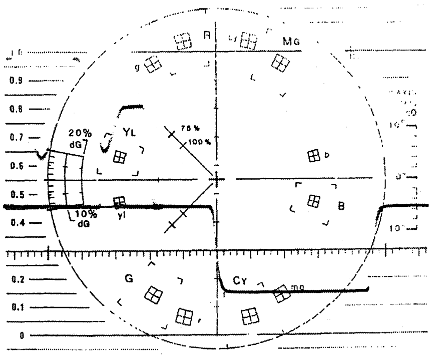
12-4. PB VIDEO PHASE, Y / C DELAY ADJUSTMENT (VP-44 BOARD, TBC-28 BOARD)

Note : Perform the adjustment order to 12-4-1, 12-4-2, 12-4-3.

12-4-1. PB VIDEO Phase Adjustment

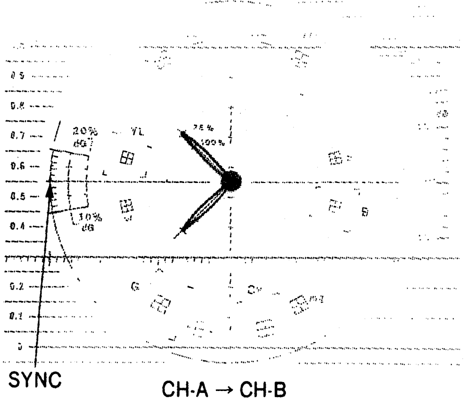
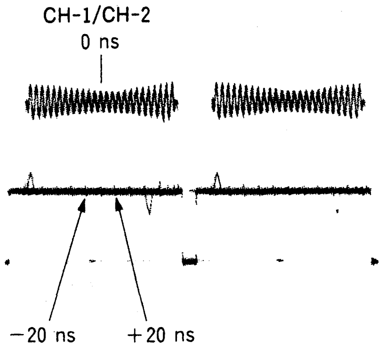
[CONNECTION for Step 1 to 3]


TSG-131A
BB
Y
B-Y
GEN LOCK
WFM-300
CH1
CH2
1751
A
B
REF.VIDEO IN
RGB/COMPONENT
G/Y OUT

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • Set the following setting Waveform Vector (1751). WFM mode SWEEP : 1 μ s (2H / MAG) FILTER : FLAT EXT REF : EXT GAIN : ×1	CH-A ⊘ **HORIZ POS control** / Vector CH-B ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM WFM mode  Spec. Set the SYNC falling edge to the center.

Continues to the next page.

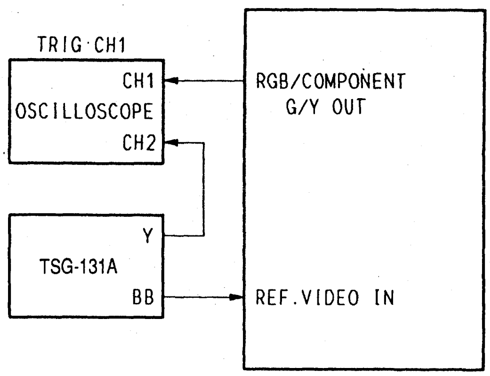
12-4-1. PB Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
Step 2 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • Waveform Vector (1751) ; SCH mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) **⊘ RV706** / TBC-28 (C-1) TRIG : EXT / WFM SCH mode  Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with RV706. (**Note :** The dot position should be adjust in the direction of the shortest movement.)
Step 3 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • WFM300 ; Bowtie mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) **⊘ RV300** / TBC-28 (M-1) TRIG : EXT / WFM Bowtie mode  Spec. Set the Bowtie dip points (cross points of the CH-1 and CH-2) on the center marker. **0 ± 20 ns**

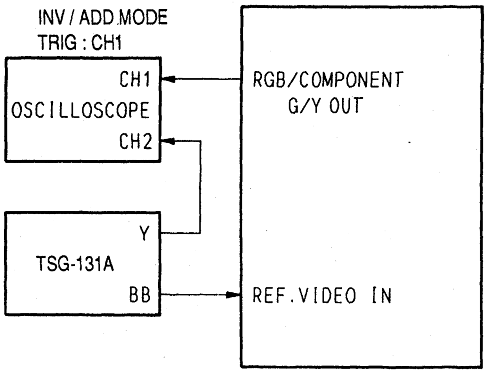
[Reference]

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1 and 3.

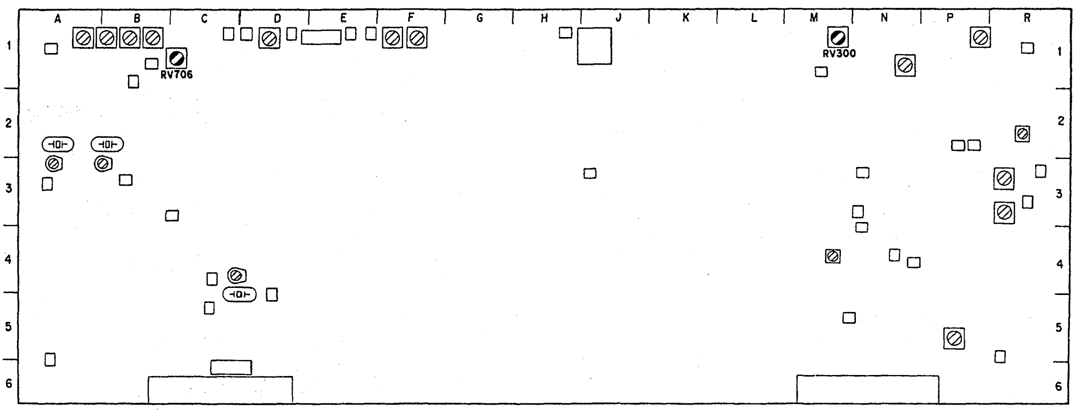
[CONNECTION for Step 1]


TRIG·CH1
CH1
OSCILLOSCOPE
CH2
Y
TSG-131A
BB
RGB/COMPONENT G/Y OUT
REF.VIDEO IN

[CONNECTION for Step 3]

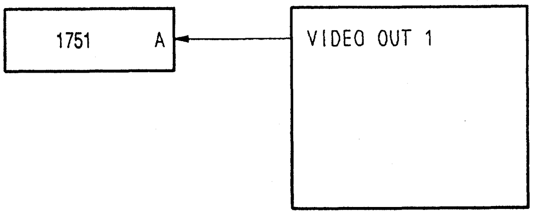

INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
Y
TSG-131A
BB
RGB/COMPONENT G/Y OUT
REF.VIDEO IN

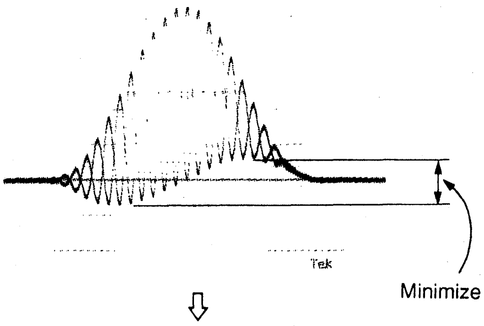
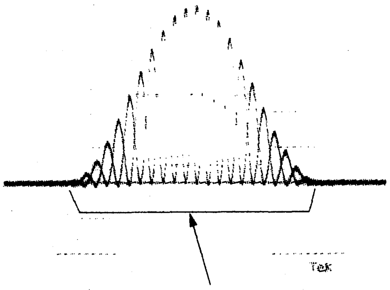
TBC-28 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV706
RV300

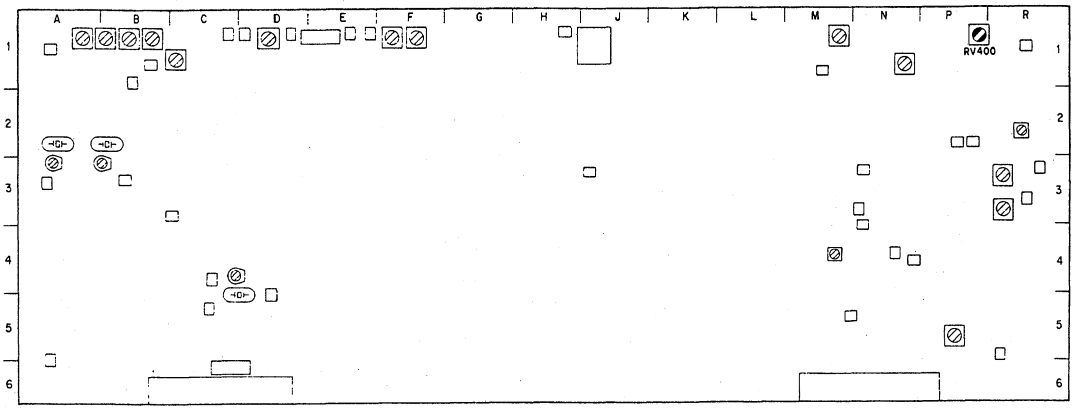
12-4-2. PB Composite Y / C Delay Adjustment

[CONNECTION]


1751 A
VIDEO OUT 1

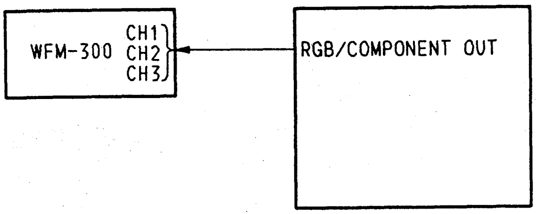
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Line 17A / CR5-1B PS (19 : 00 – 22 : 00)	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV400** / TBC-28 (P-1) TRIG : INT / WFM WFM Before adjustment 10T portion  ⇩ After adjustment  Spec. Flat

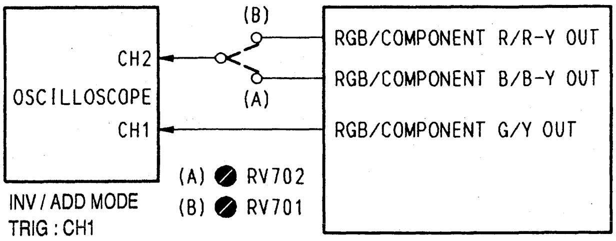
TBC-28 board (A side)

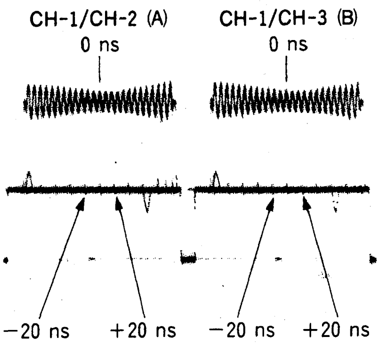

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV400

12-4-3. PB Component Y / C Delay Adjustment

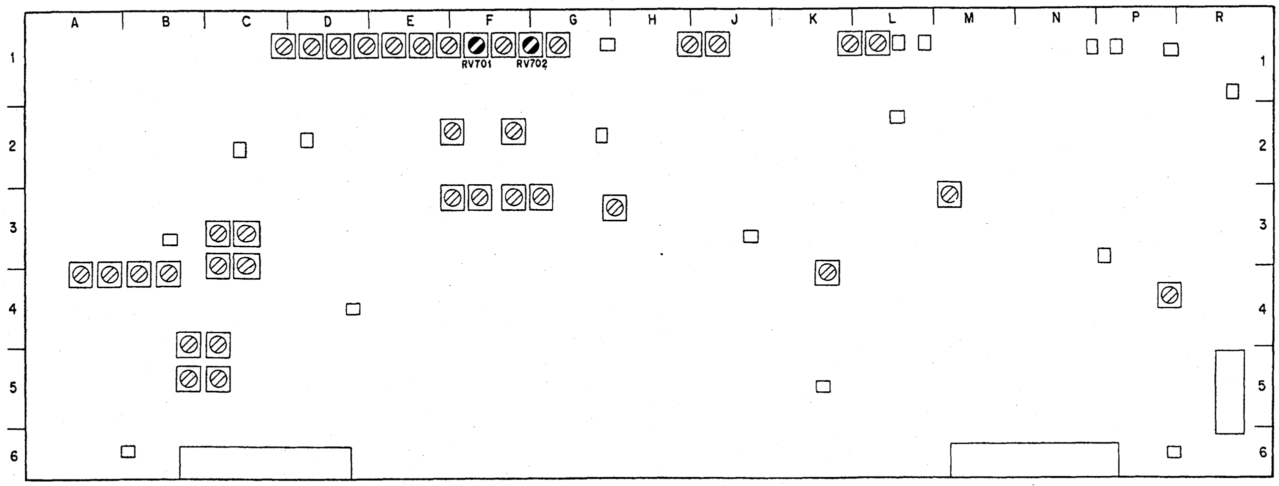
[CONNECTION]


WFM-300
CH1
CH2
CH3
RGB/COMPONENT OUT


OSCILLOSCOPE
CH2
CH1
(B)
(A)
RGB/COMPONENT R/R-Y OUT
RGB/COMPONENT B/B-Y OUT
RGB/COMPONENT G/Y OUT
INV / ADD MODE
TRIG : CH1
(A) ⊘ RV702
(B) ⊘ RV701

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • WFM300 ; Bowtie mode	RGB / COMPONENT OUT (75 Ω terminated) (A) B-Y DELAY ⊘ **RV702** / VP-44 (G-1) (B) R-Y DELAY ⊘ **RV701** / VP-44 (F-1) TRIG : EXT / WFM Bowtie mode  Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. **0 ± 20 ns**

VP-44 board (A side)


A
B
C
D
E
F
G
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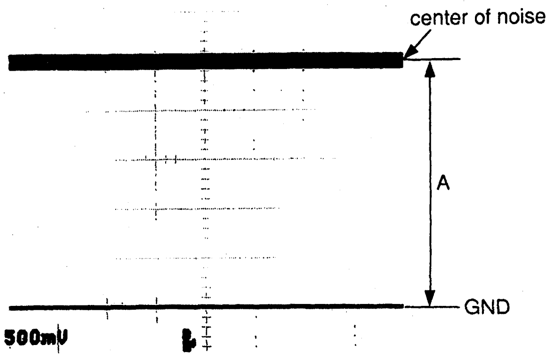
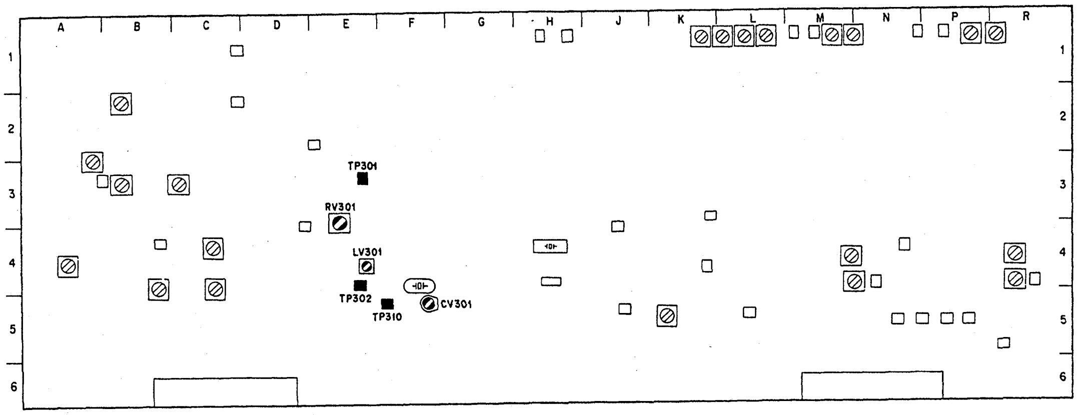
J
K
L
M
N
P
R
1
2
3
4
5
6
RV701
RV702

12-5. VRA BOARD ADJUSTMENT

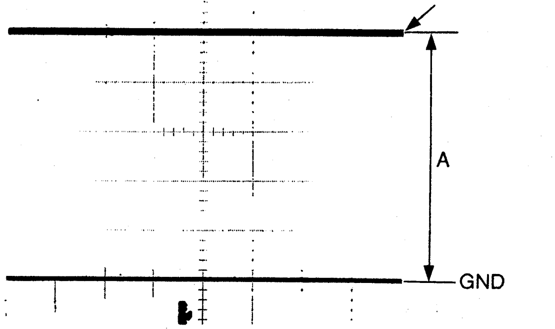
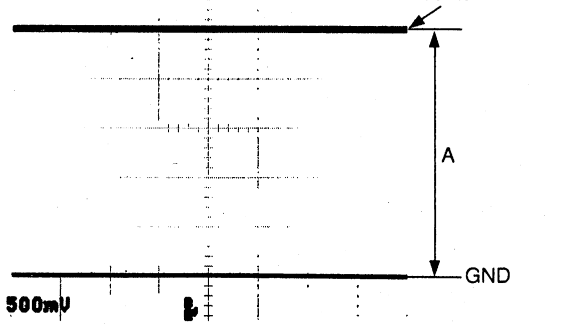
12-5-1. COMPONENT H Lock Loop Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 1	TP302 / VRA-7 (E-4) ⊘ **LV301** / VRA-7 (E-4) Oscilloscope  Spec. **A = 2.5 ± 0.1 Vdc**

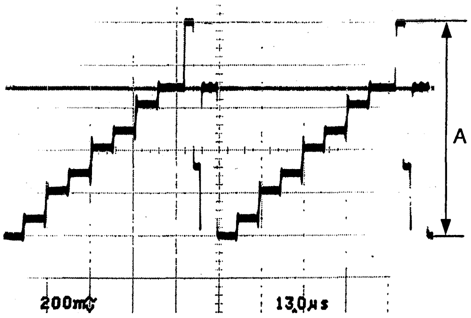
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP301
RV301
LV301
TP302
TP310
CV301

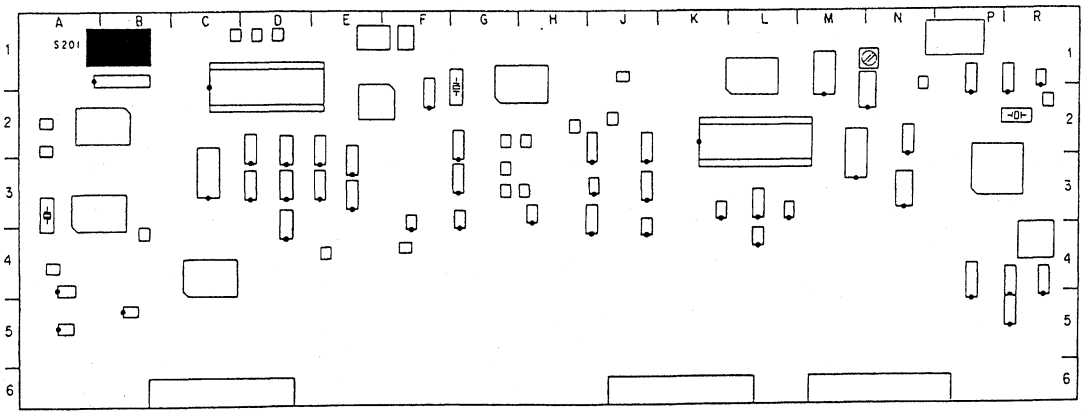
12-5-2. COMPOSITE 4 Fsc Lock Loop DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	TP310 / VRA-7 (F-5) ⊘ **CV301** / VRA-7 (F-5) Oscilloscope  center of noise A GND Spec. **A = 2.0 ± 0.1 Vdc**
	TP301 / VRA-7 (E-3) ⊘ **RV301** / VRA-7 (E-3) Oscilloscope  center of noise A GND 500mV Spec. **A = 2.5 ± 0.1 Vdc**

12-5-3. COMPONENT Y Level Adjustment

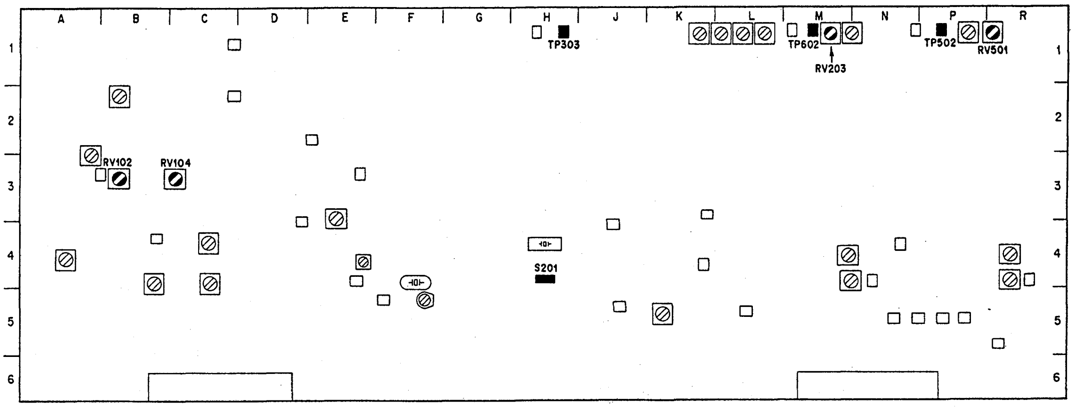
Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 1	TP502 / VRA-7 (P-1) ⊘ **RV501** / VRA-7 (R-1) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 1.00 ± 0.01 V**

SS-61 board (A side)



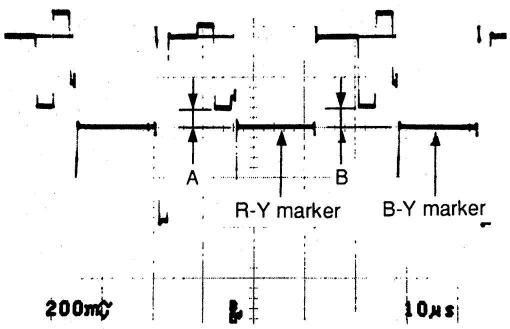
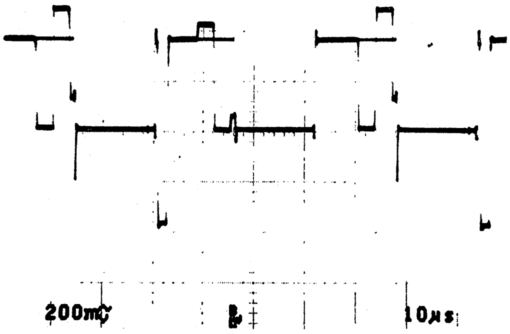
A B C D E F G H J K L M N P R
1 2 3 4 5 6
S201

VRA-7 board (A side)

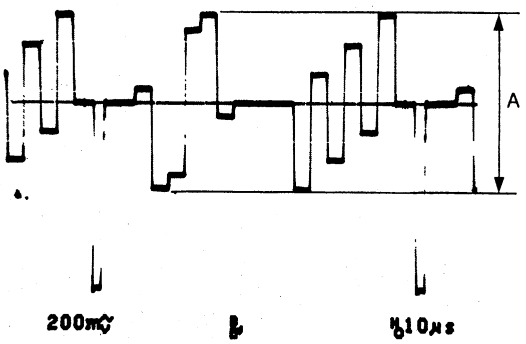


A B C D E F G H J K L M N P R
1 2 3 4 5 6
TP303
TP602
RV203
TP502
RV501
RV102
RV104
S201

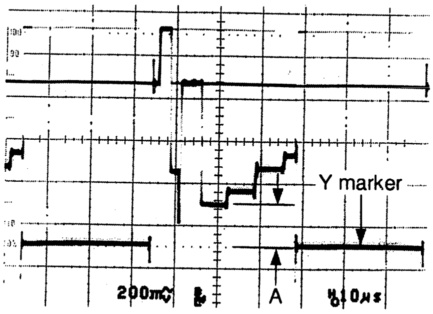
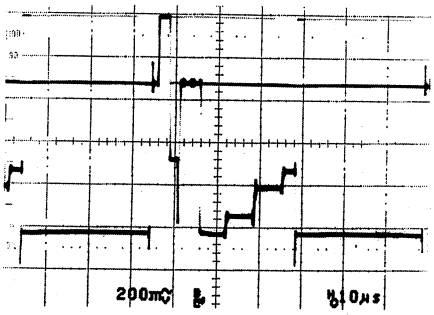
12-5-4. COMPONENT A / D R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • S201-1 (MAINTENANCE MODE) / SS-61 (B-1) ; CLOSE (ON) • S201 (AD LEVEL REF) / VRA-7 (H-4) ; CLOSE (ON) • After adjustment is completed, set S201-1 / SS-61 and S201 / VRA-7 to OFF. CONNECTION 1	(A) A / D R-Y TP602 / VRA-7 (M-1) ⊘ **RV102** / VRA-7 (B-3) (B) A / D B-Y TP602 / VRA-7 (M-1) ⊘ **RV104** / VRA-7 (C-4) TRIG : TP303 / VRA-7 (H-1) Oscilloscope Before adjustment  ⇩ After adjustment  Spec. **A = 0 ± 0.01 V** **B = 0 ± 0.01 V**

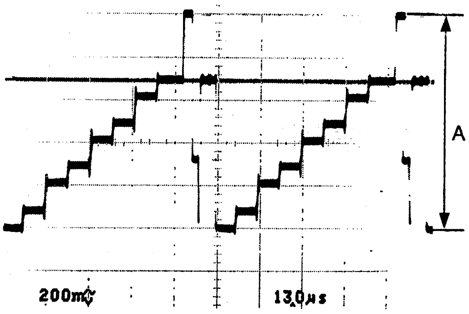
12-5-5. COMPONENT D / A R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 1	TP602 / VRA-7 (M-1) ⊘ **RV203** / VRA-7 (M-1) Oscilloscope  Spec. A = **0.933 ± 0.01 V**

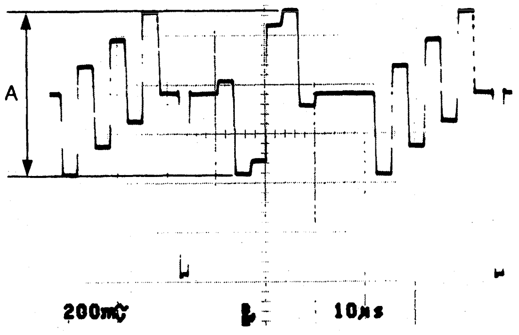
12-5-6. COMPOSITE A / D Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE • S201-1 (MAINTENANCE MODE) / SS-61 (B-1) ; CLOSE (ON) • S201 (AD LEVEL REF) / VRA-7 (H-4) ; CLOSE (ON) • After adjustment is completed, set S201-1 / SS-61 and S201 / VRA-7 to OFF. CONNECTION 2	TP502 / VRA-7 (P-1) ⊘ **RV101** / VRA-7 (B-2) TRIG : TP303 / VRA-7 (H-1) Oscilloscope before adjustment  ⇩ after adjustment  Spec. **A = 0 ± 0.01 V**

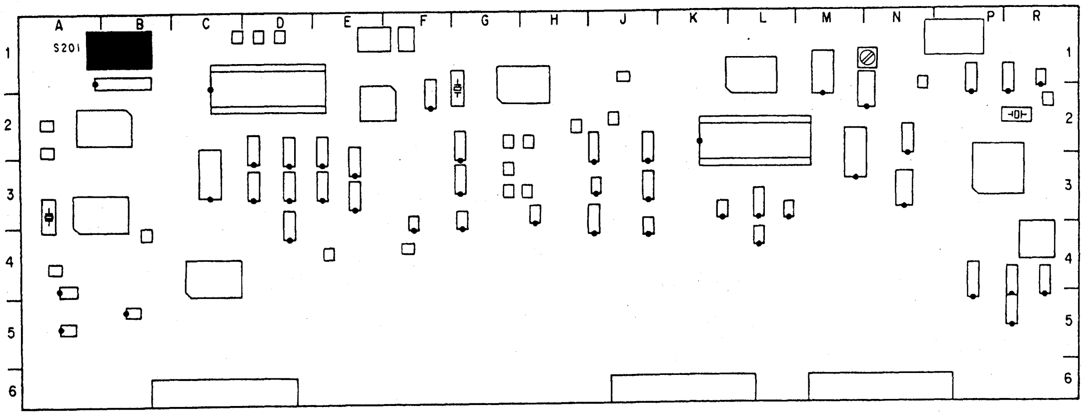
12-5-7. COMPOSITE D / A Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	TP502 / VRA-7 (P-1) ⊘ **RV201** / VRA-7 (P-1) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 1.00 ± 0.01 V**

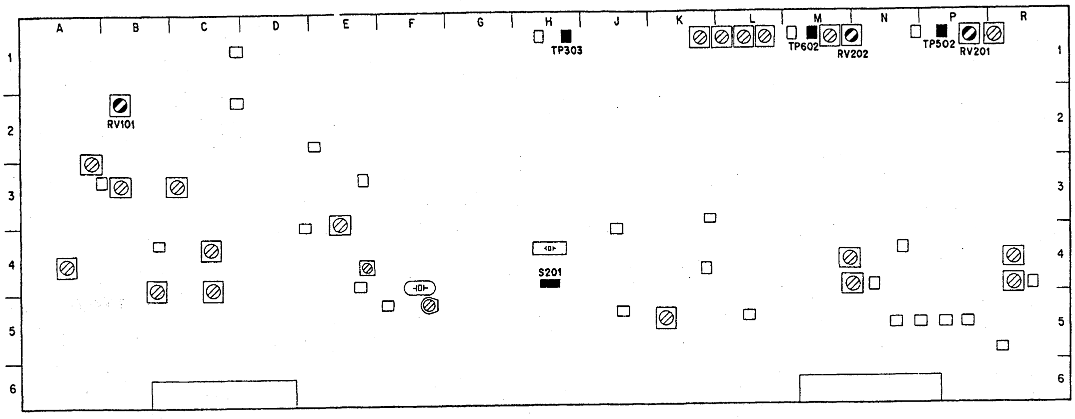
12-5-8. COMPOSITE D / A C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	TP602 / VRA-7 (M-1) ⊘ **RV202** / VRA-7 (N-1) TRIG : TP602 / VRA-7 (M-1) Oscilloscope  Spec. **A = 0.933 ± 0.01 V**

SS-61 board (A side)

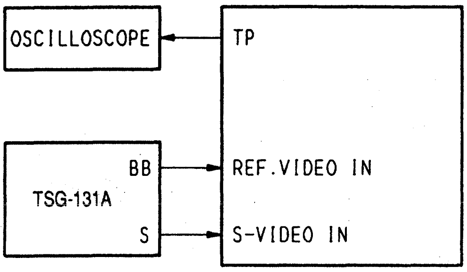

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
S201

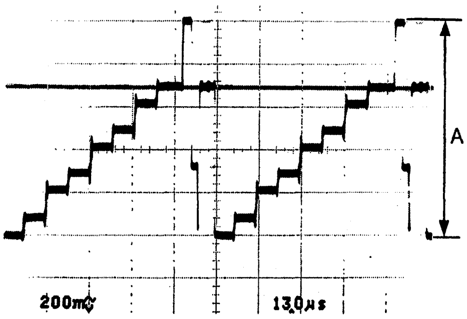
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP303
TP602
RV202
TP502
RV201
RV101
S201

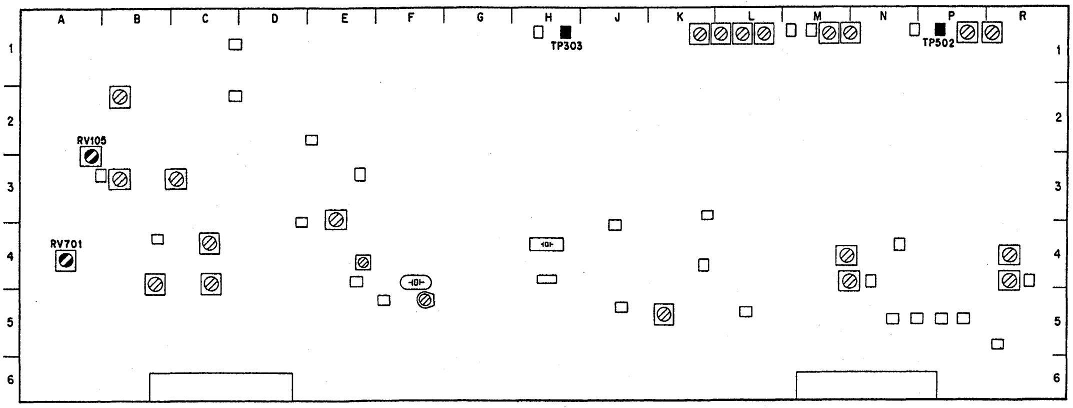
12-5-9. S-VIDEO Y Level Adjustment

[CONNECTION]

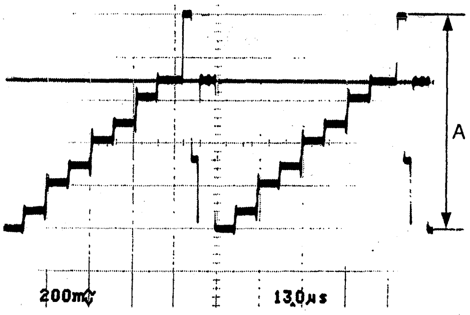

OSCILLOSCOPE
TP
BB
TSG-131A
S
REF.VIDEO IN
S-VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
• EE mode • S-VIDEO INPUT ; S-VIDEO 100 % Color bar • VIDEO IN switch / Sub control panel ; S-VIDEO	TP502 / VRA-7 (P-1) ⊘ **RV105** / VRA-7 (A-2) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 1.00 ± 0.01 V**

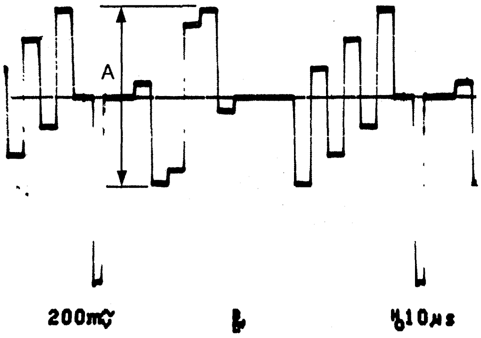
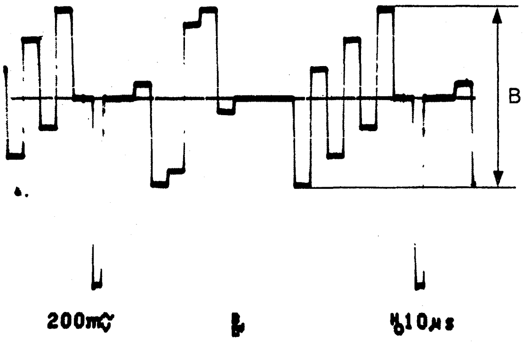
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP303
TP502
RV105
RV701

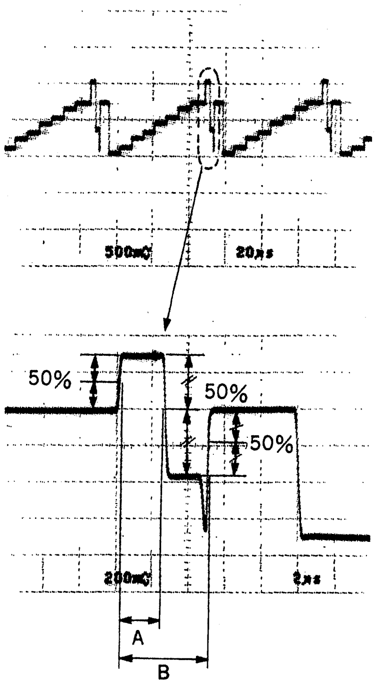
12-5-10. RGB Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; RGB 100 % Color bar • VIDEO IN switch / Sub control panel ; RGB CONNECTION 1	TP502 / VRA-7 (P-1) ⊘ **RV701** / VRA-7 (A-4) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 1.00 ± 0.01 V**

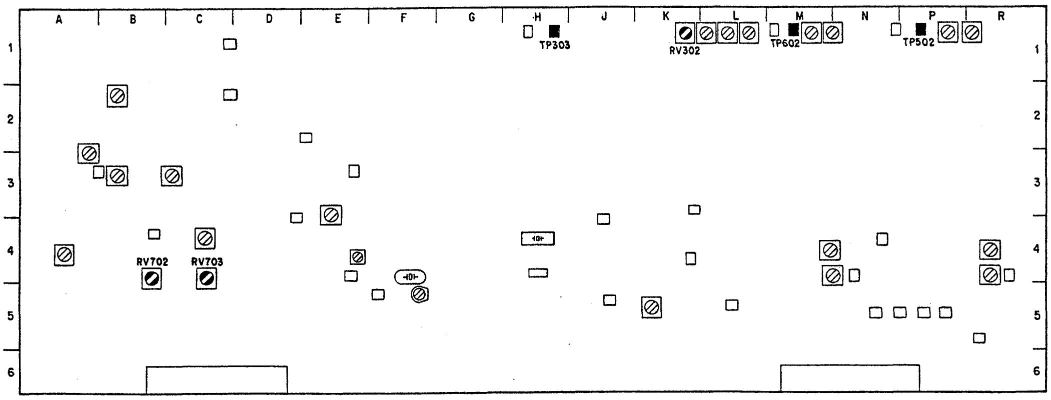
12-5-11. RGB C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; RGB 100 % Color bar • VIDEO IN switch / Sub control panel ; RGB CONNECTION 1	Step 1 (A) R-Y level TP602 / VRA-7 (M-1) ⊘ **RV702** / VRA-7 (B-4) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 0.933 ± 0.01 V**
	Step 2 (B) B-Y level TP602 / VRA-7 (M-1) ⊘ **RV703** / VRA-7 (C-4) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **B = 0.933 ± 0.01 V**

12-5-12. Y REF SYNC Timing and Pulse Width Adjustment

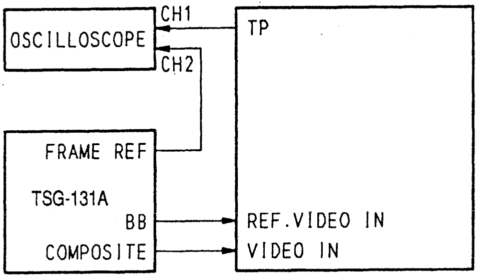
Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar **Note :** Final adjustment of RV302 is performed at overall video phase adjustment (Section 12-7), so it may change the value of A. CONNECTION 1	(A) Timing TP502 / VRA-7 (P-1) ⊘ **RV302** / VRA-7 (K-1) (B) Pulse Width Check TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. **A = 2.65 ± 0.05 μ s** **B = 5.0 ± 0.1 μ s**

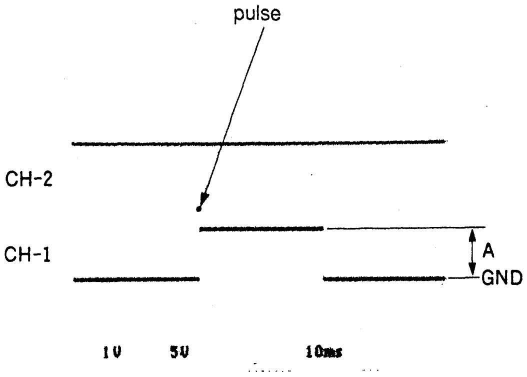
VRA-7 board (A side)

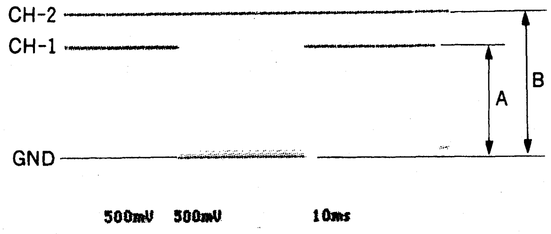
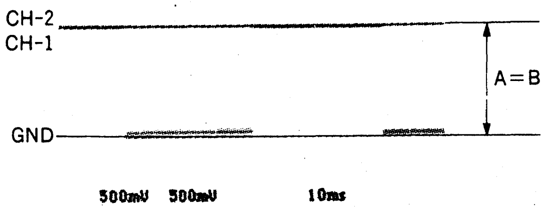

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP303
RV302
TP602
TP502
RV702
RV703

12-5-13. COMPOSITE SCH Detect Circuit Adjustment

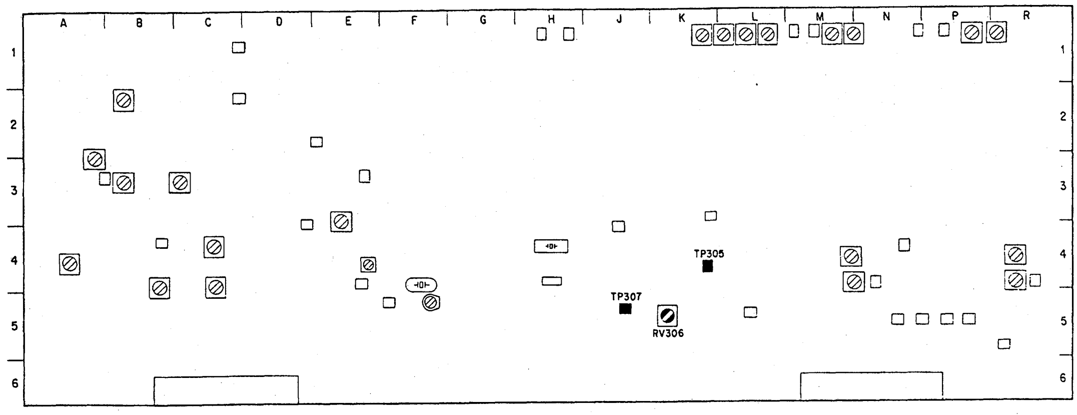
[CONNECTION for Step 1, 2]


OSCILLOSCOPE
CH1
CH2
TP
FRAME REF
TSG-131A
BB
COMPOSITE
REF.VIDEO IN
VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar (SCH = 0°) • VIDEO IN switch / Sub control panel ; COMPOSITE	(A) Check CH-1 : TP305 / VRA-7 (K-4) CH-2 : FRAME PULSE / TSG-131A TRIG : CH-1 Oscilloscope  pulse CH-2 CH-1 A GND 1V 5V 10ms Spec. A = 1.5 ± 0.5 Vdc

Conditions for adjustment	Adjustment point • Specifications
Step 2 • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar (SCH = 0°) • VIDEO IN switch / Sub control panel ; COMPOSITE	(B) SCH CH-1 : TP305 / VRA-7 (K-4) CH-2 : TP307 / VRA-7 (J-5) ⊘ **RV306** / VRA-7 (K-5) TRIG : CH-1 Oscilloscope Before adjustment  CH-2 CH-1 GND A B 500mV 500mV 10ms A=B ⇩ After adjustment  CH-2 CH-1 GND A=B 500mV 500mV 10ms Spec. **A – B = 0 ± 0.05 Vdc**

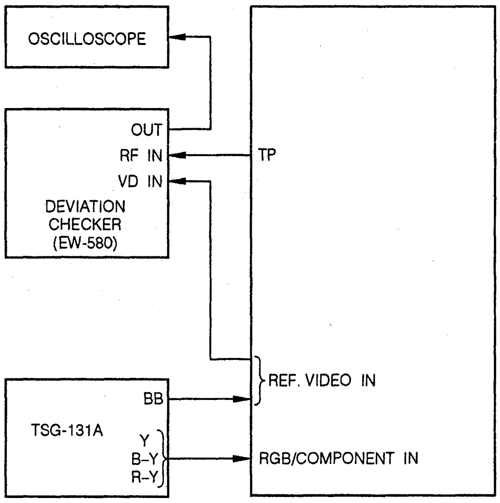
VRA-7 board (A side)

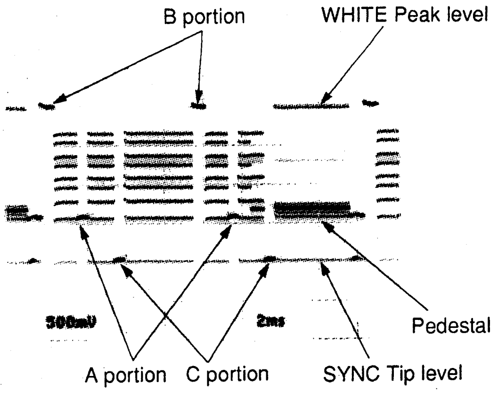

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP305
TP307
RV306

12-5-14. Y Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

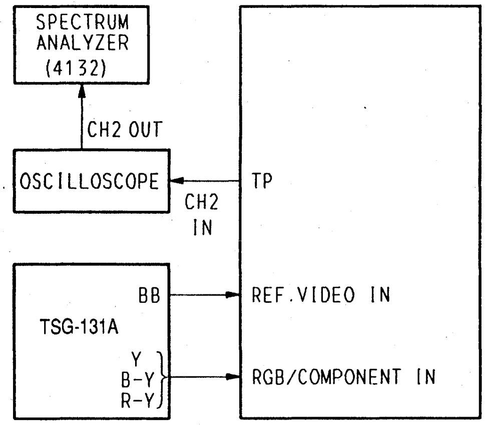
[CONNECTION]

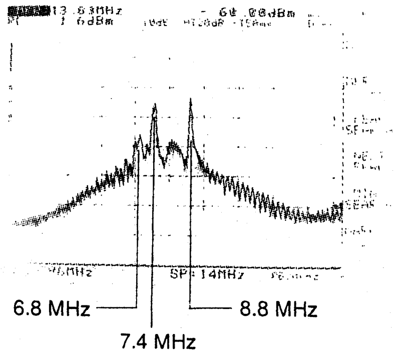

OSCILLOSCOPE
OUT
RF IN
VD IN
DEVIATION CHECKER (EW-580)
TP
REF. VIDEO IN
BB
TSG-131A
Y
B-Y
R-Y
RGB/COMPONENT IN

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • Set the switches of the deviation checker following. NTSC / PAL : PAL METAL / OXIDE : METAL Y / C : Y • Connect the TP503 / VRA-7 (P-5) to RF IN / deviation checker.	EW-580 / OUT (A) Y CARRIER ⊘ **RV503** / VRA-7 (R-4) (B) Y DEVIATION ⊘ **RV502** / VRA-7 (R-4) TRIG : TP303 / VRA-7 (H-1) Oscilloscope  Spec. (A) Pedestal and A portion should be in line. (B) B portion and the WHITE Peak level, C portion and the SYNC Tip level should be in line.

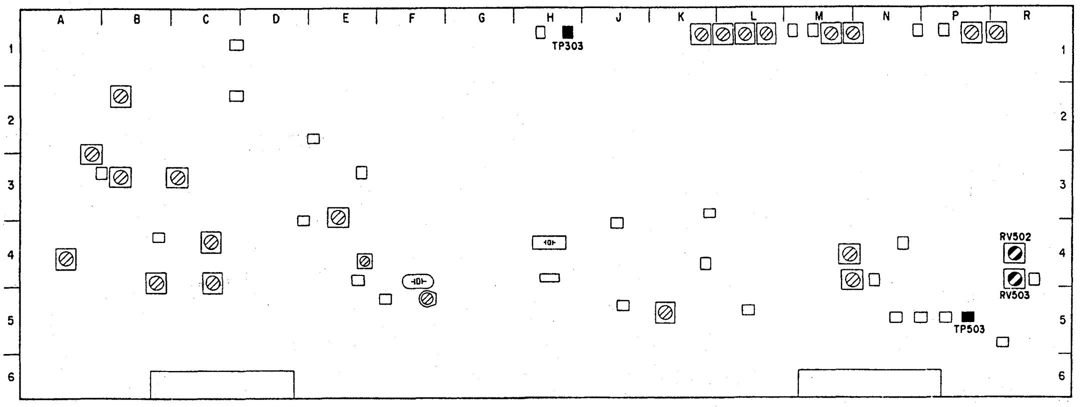
(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]


SPECTRUM ANALYZER (4132)
CH2 OUT
OSCILLOSCOPE
CH2 IN
TP
TSG-131A
BB
REF.VIDEO IN
Y
B-Y
R-Y
RGB/COMPONENT IN

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT Pulse & Bar	(A) Y CARRIER TP503 / VRA-7 (P-5) ⊘ **RV503** / VRA-7 (R-4) (B) Y DEVIATION TP503 / VRA-7 (P-5) ⊘ **RV502** / VRA-7 (R-4) Spectrum analyzer  Spec. (A) The center peak level should be 7.4 MHz. (B) The interval between the two peak levels (7.4 MHz and 8.8 MHz) should be 1.4 MHz.

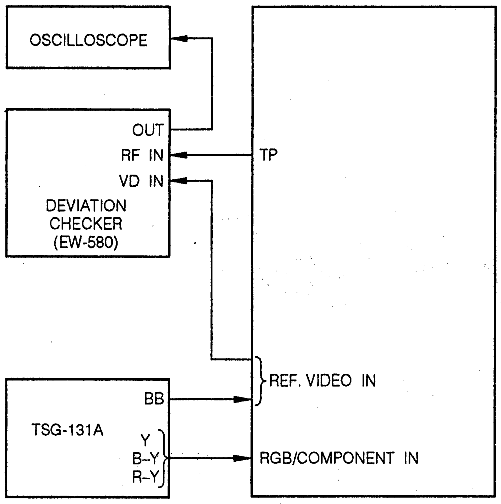
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP303
RV502
RV503
TP503

12-5-15. C Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

[CONNECTION]


OSCILLOSCOPE
OUT
RF IN
VD IN
DEVIATION CHECKER (EW-580)
TP
REF. VIDEO IN
TSG-131A
BB
Y
B-Y
R-Y
RGB/COMPONENT IN

<table>
<tr><th>Conditions for adjustment</th><th>Adjustment point • Specifications</th></tr>
<tr><td>

- EE mode
- RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar
- Set the switches of the deviation checker following.
  NTSC / PAL : PAL
  METAL / OXIDE : METAL
  Y / C : C
- Connect the TP603 / VRA-7 (P-5) to RF IN / deviation checker.

</td><td>

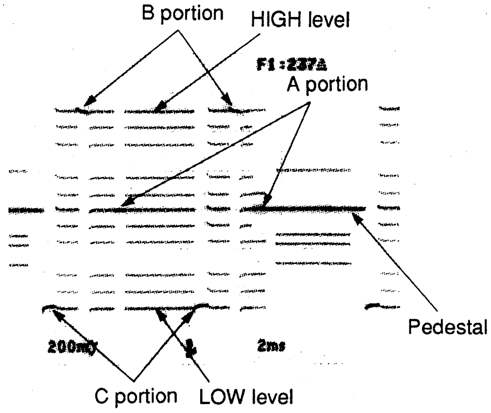
EW-580 / OUT

(A) C CARRIER
⊘ **RV603** / VRA-7 (M-4)

(B) C DEVIATION
⊘ **RV602** / VRA-7 (M-4)

TRIG : TP303 / VRA-7 (H-1)

Oscilloscope

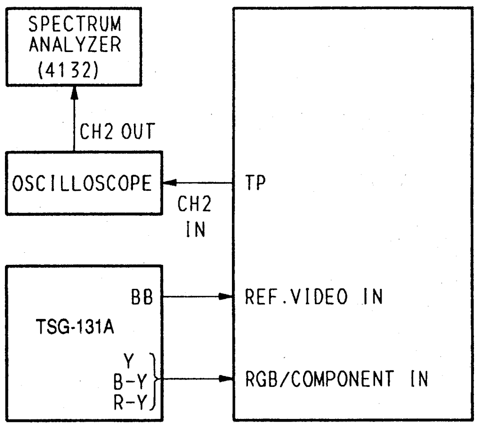


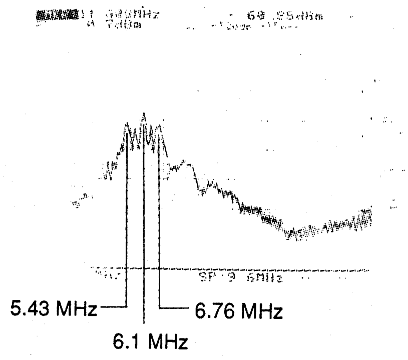
Spec. (A) Pedestal and A portion should be in line.
(B) B portion and the HIGH level, C portion and the LOW level should be in line.

</td></tr>
</table>

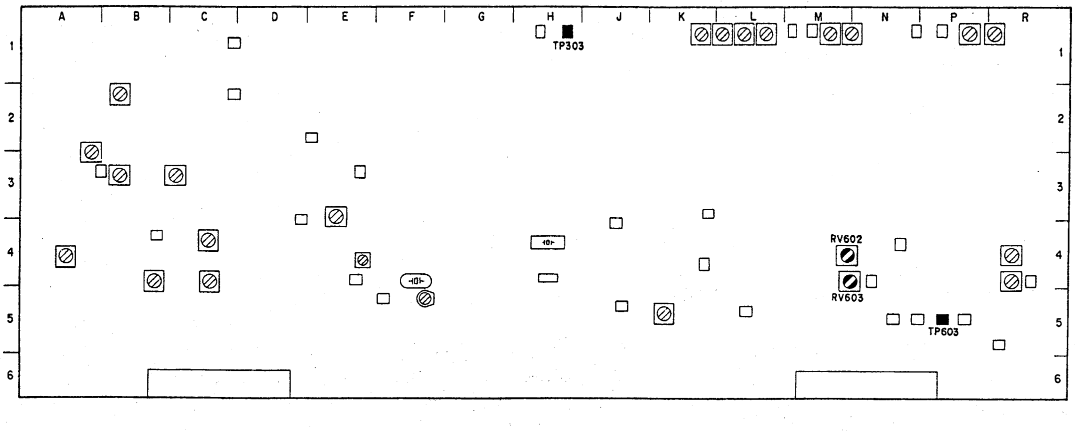
(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]


SPECTRUM ANALYZER (4132)
CH2 OUT
OSCILLOSCOPE
CH2 IN
TP
TSG-131A
BB
REF.VIDEO IN
Y
B-Y
R-Y
RGB/COMPONENT IN

Conditions for adjustment	Adjustment point • Specifications
• EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar	(A) C CARRIER TP603 / VRA-7 (P-5) ⊘ **RV603** / VRA-7 (M-4) (B) C DEVIATION TP603 / VRA-7 (P-5) ⊘ **RV602** / VRA-7 (M-4) Spectrum analyzer  Spec. (A) The center peak level should be 6.1 MHz. (B) The interval between the two peak levels (5.43 MHz and 6.76 MHz) should be 1.33 MHz.

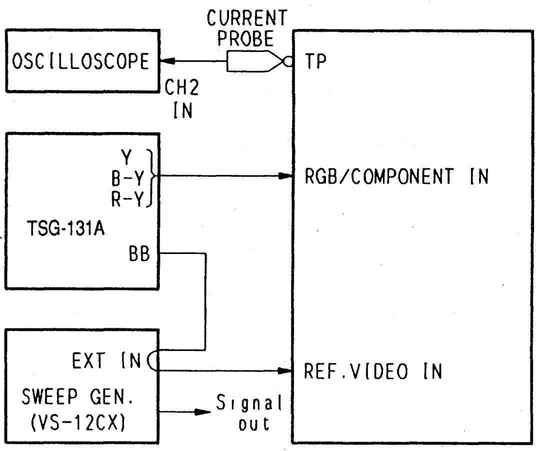
VRA-7 board (A side)

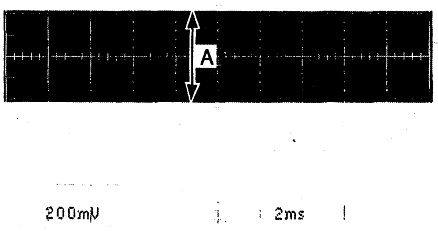

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP303
RV602
RV603
TP603

12-6. RP BOARD ADJUSTMENT

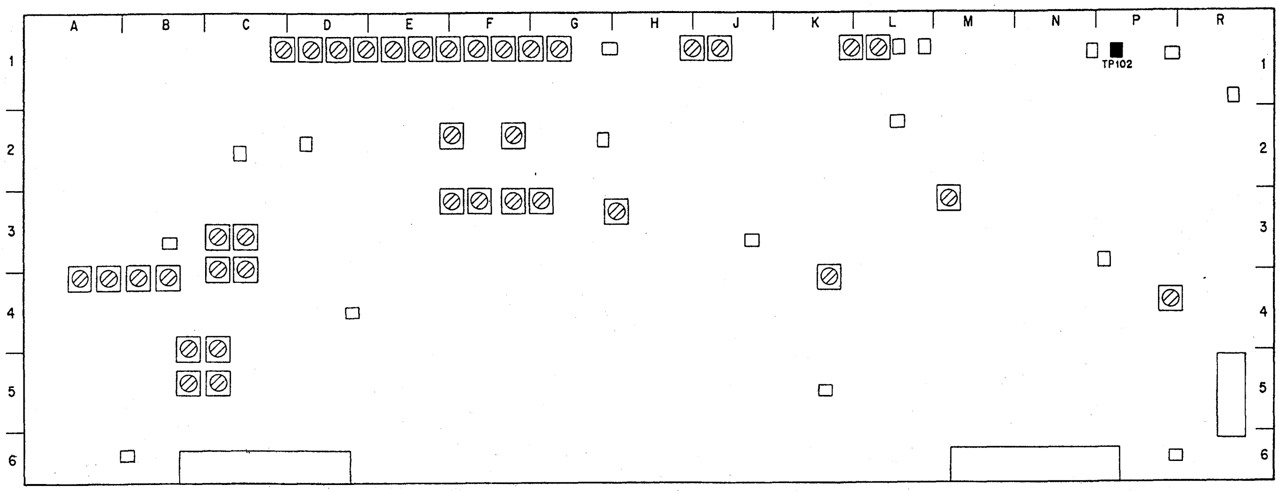
12-6-1. Y REC Current Adjustment

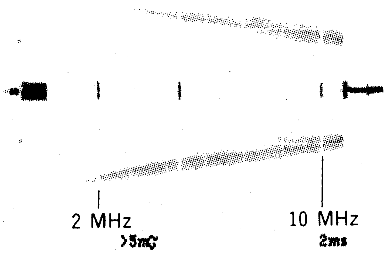
[CONNECTION for Step 1, 2]


CURRENT PROBE
OSCILLOSCOPE
CH2 IN
TP
Y
B-Y
R-Y
TSG-131A
BB
RGB/COMPONENT IN
EXT IN
SWEEP GEN. (VS-12CX)
Signal out
REF.VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • Connect TP1-E1 / RP-70 (J-1) (J-1) with a shorting clip. • Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1).	TP2 / RP-70 (J-1) ⊘ **Level control** / sweep generator TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.40 ± 0.02 V at 5 MHz**

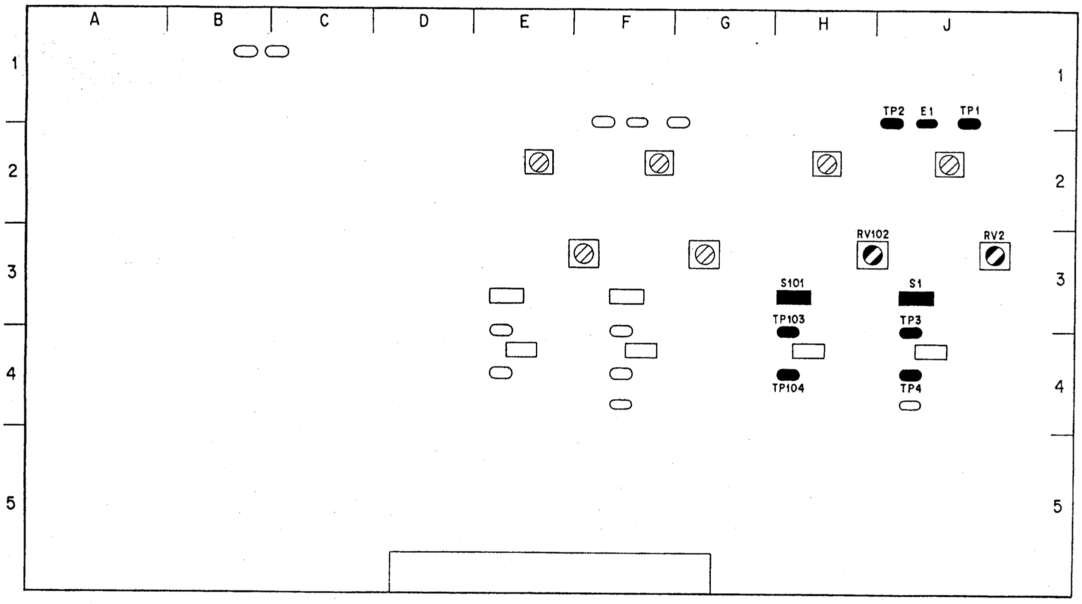
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP102

Conditions for adjustment	Adjustment point • Specifications
Step 2 • S1, S101 / RP-70 (J-3) (H-3) ; OPEN (OFF) • Short TP3-TP4 / RP-70 (J-3) (J-4) and TP103-TP104 / RP-70 (H-3) (H-4) with shorting clip and measure with current probe. • Supply the sweep signal from the sweep generator connected between TP2-TP1 / RP-70 (J-1) (J-1). • REC mode Blank tape • After adjustment is completed, remove the shorting clip connected between TP1-E1 and sweep signal input.	YA TP3-TP4 / RP-70 (J-3) (J-4) ⊘ **RV2** / RP-70 (J-3) YB TP103-TP104 / RP-70 (H-3) (H-4) ⊘ **RV102** / RP-70 (H-3) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. 2 MHz reference (100 %), **10 MHz = 65^{+20}_{-10} %**

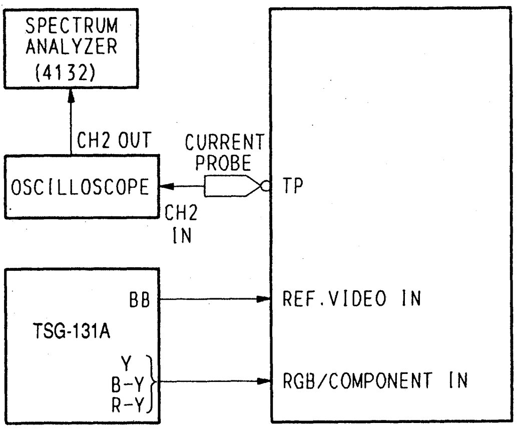
Continues to the next page.

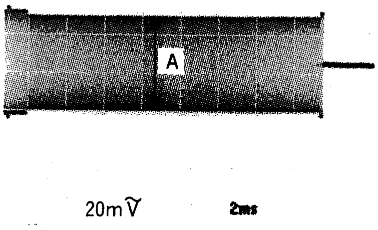
RP-70 board (A side)

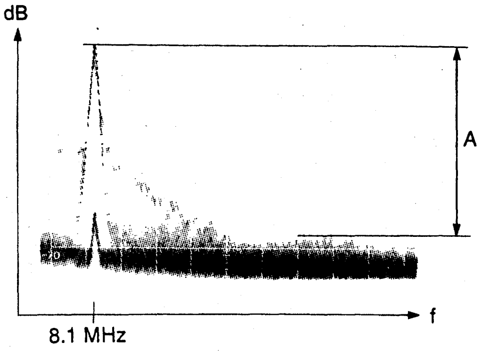


12-6-1. Y REC Current Adjustment (Continued)

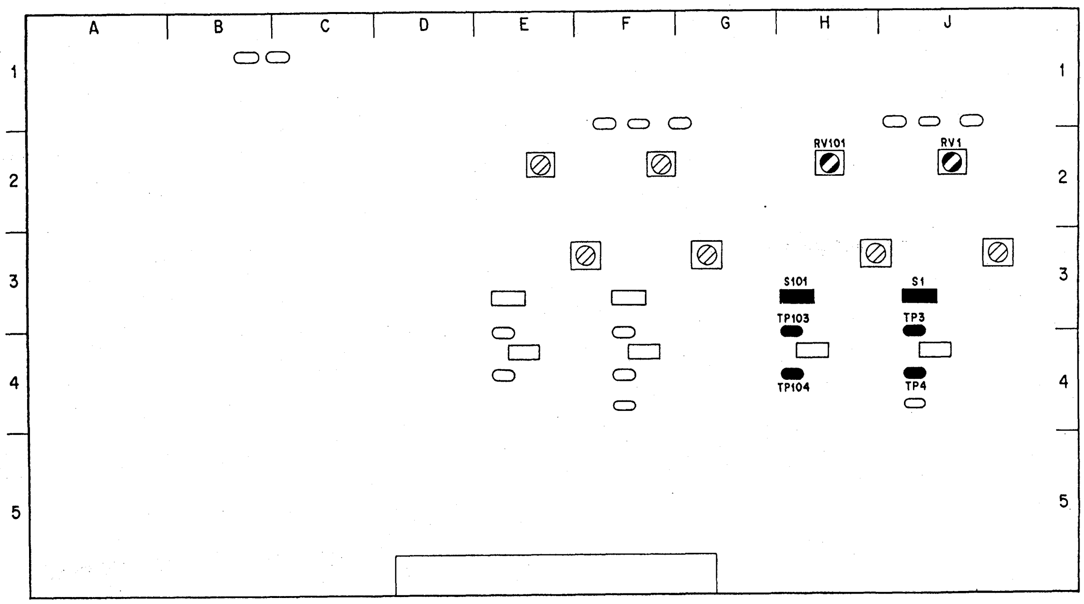
[CONNECTION for Step 3, 4]


SPECTRUM ANALYZER (4132)
CH2 OUT
CURRENT PROBE
OSCILLOSCOPE
CH2 IN
TP
BB
TSG-131A
Y
B-Y
R-Y
REF.VIDEO IN
RGB/COMPONENT IN

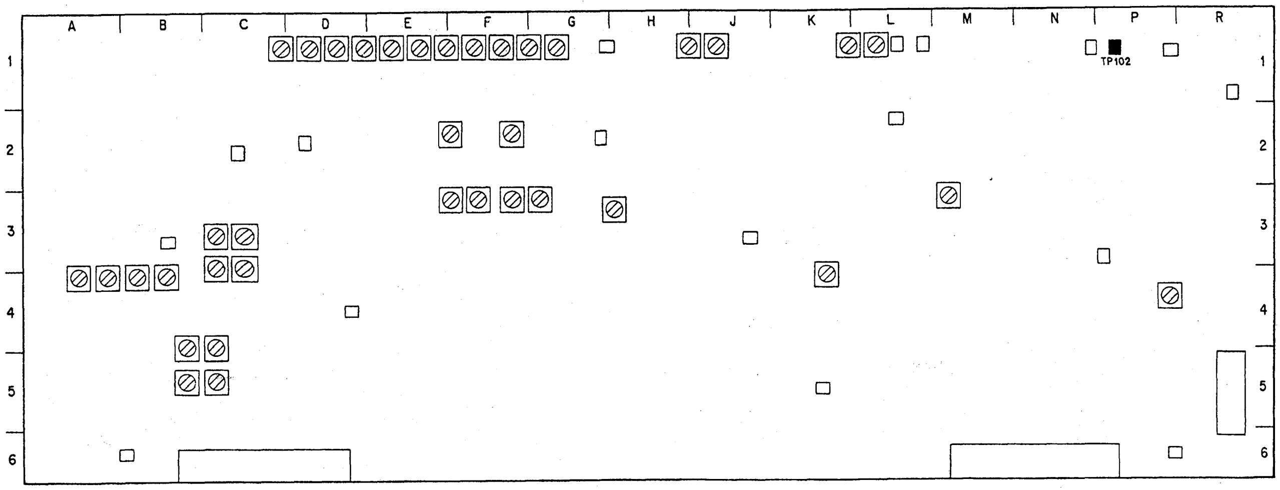
Conditions for adjustment	Adjustment point • Specifications
Step 3 • RGB / COMPONENT INPUT ; COMPONENT 50 % Flat field • REC mode Blank tape	YA TP3-TP4 / RP-70 (J-3) (J-4) ⊘ **RV1** / RP-70 (J-2) YB TP103-TP104 / RP-70 (H-3) (H-4) ⊘ **RV101** / RP-70 (H-2) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 45 ± 10 mA**

Conditions for adjustment	**Adjustment point • Specifications**
Step 4 (Check) • REC mode Blank tape • After adjustment is completed, remove the shorting clip and the current probe. • Set the S1, S101 / RP-70 to ON.	Oscilloscope / OUT Both YA and YB Spectrum analyzer  Spec. **A ≧ 35 dB**

RP-70 board (A side)

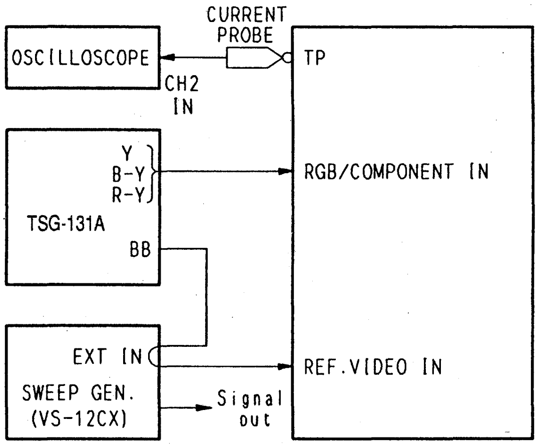

A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV101
RV1
S101
S1
TP103
TP3
TP104
TP4

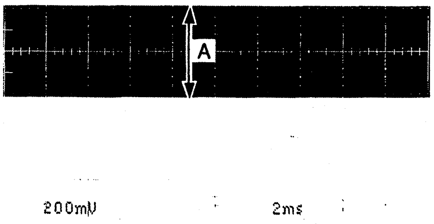
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP102

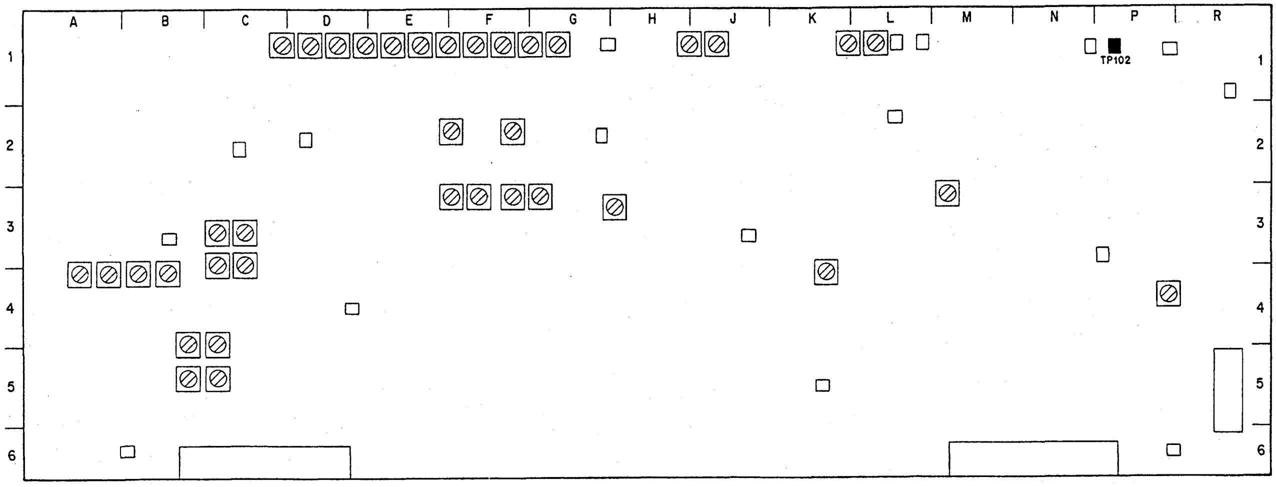
12-6-2. C REC Current Adjustment

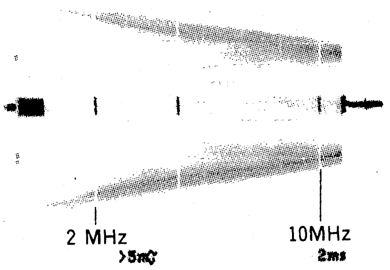
[CONNECTION for Step 1, 2]


CURRENT PROBE
OSCILLOSCOPE
CH2 IN
TP
Y
B-Y
R-Y
TSG-131A
BB
RGB/COMPONENT IN
EXT IN
SWEEP GEN. (VS-12CX)
Signal out
REF.VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • Short TP201 – E201 / RP-70 (G-1) (F-1) with a short clip. • Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1).	TP202 / RP-70 (F-1) ⊘ **Level control** / sweep generator TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.40 ± 0.02 V at 5 MHz**

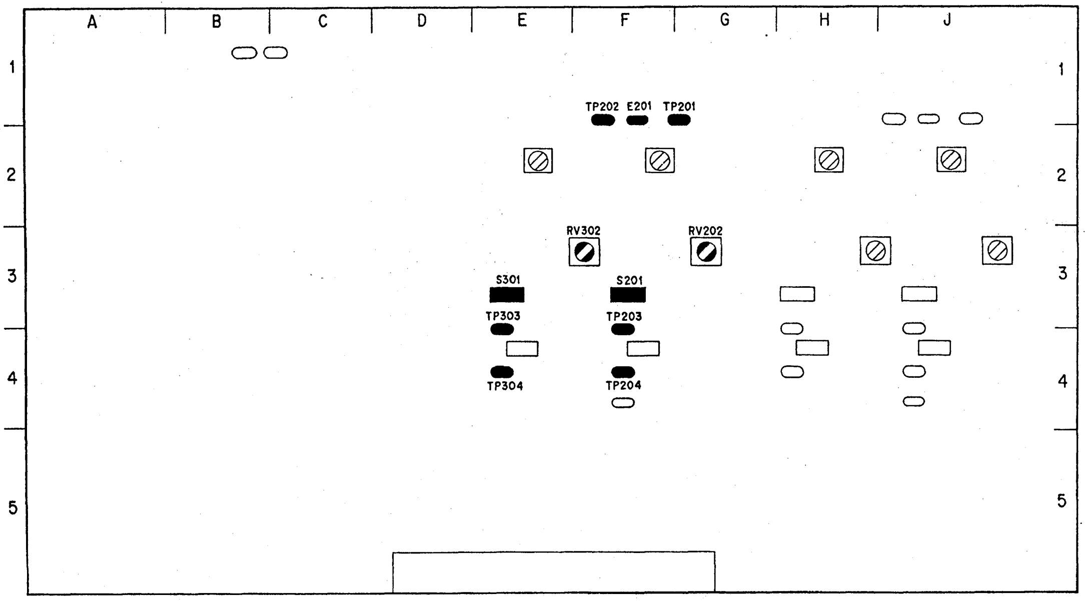
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP102

Conditions for adjustment	Adjustment point • Specifications
Step 2 • S201, S301 / RP-70 (F-3) (E-3) ; OPEN (OFF) • Connect TP203 – TP204 / RP-70 (F-3) (F-4) and TP303 – TP304 / RP-70 (E-3) (E-4) with shorting clip and measure with current probe. • Supply the sweep signal from the sweep generator connected between TP201 – TP202 / RP-70 (G-1) (F-1). • REC mode Blank tape • After adjustment is completed, remove the shorting clip connected between TP201-E201 and sweep signal input.	CA TP203-TP204 / RP-70 (F-3) (F-4) ⊘ **RV202** / RP-70 (G-3) CB TP303-TP304 / RP-70 (E-3) (E-4) ⊘ **RV302** / RP-70 (F-3) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. 2 MHz reference (100 %), **10 MHz = 60^{+30}_{-20} %**

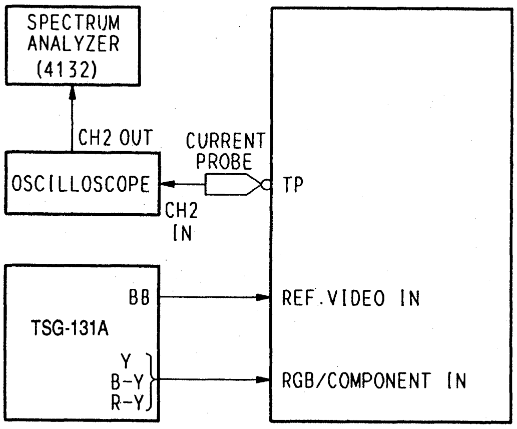
Continues to the next page.

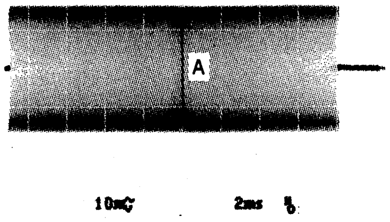
RP-70 board (A side)

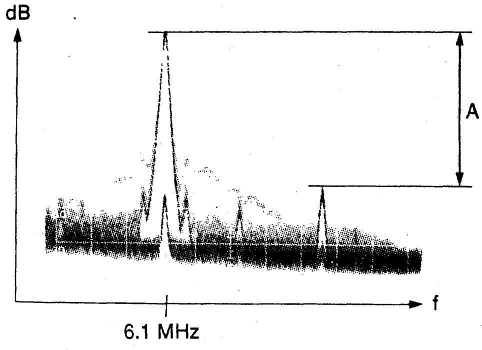

A
B
C
D
E
F
G
H
J
1
2
3
4
5
TP202
E201
TP201
RV302
RV202
S301
S201
TP303
TP203
TP304
TP204

12-6-2. C REC Current Adjustment (Continued)

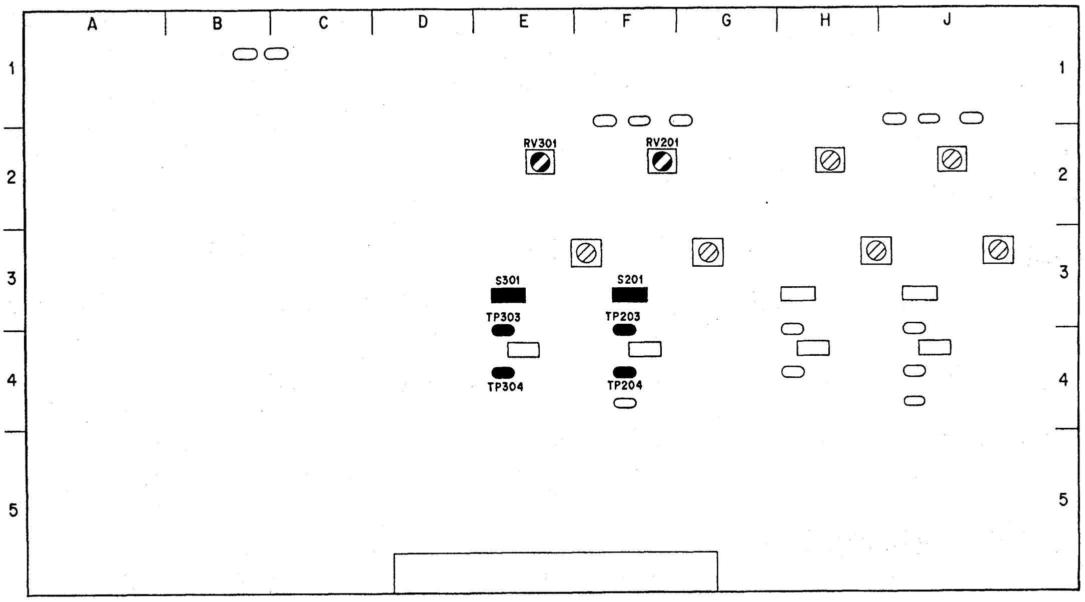
[CONNECTION for Step 3, 4]


SPECTRUM
ANALYZER
(4132)
CH2 OUT
CURRENT
PROBE
OSCILLOSCOPE
CH2
IN
TP
BB
TSG-131A
Y
B-Y
R-Y
REF.VIDEO IN
RGB/COMPONENT IN

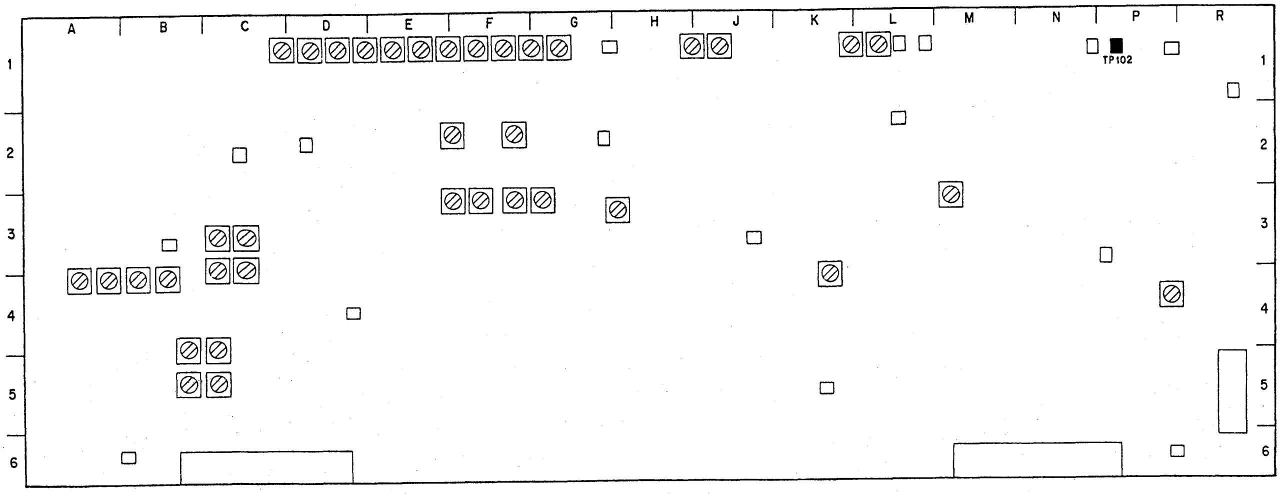
Conditions for adjustment	Adjustment point • Specifications
Step 3 • RGB / COMPONENT INPUT ; COMPONENT 50 % Flat field • REC mode Blank tape	CA TP203-TP204 / RP-70 (F-3) (F-4) ⊘ **RV201** /.RP-70 (F-2) CB TP303-TP304 / RP-70 (E-3) (E-4) ⊘ **RV301** / RP-70 (E-2) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 50 ± 10 mA**

Conditions for adjustment	Adjustment point • Specifications
Step 4 (Check) • REC mode Blank tape • After adjustment is completed, remove the shorting clip and the current probe. • Set the S201, S301 / RP-70 to ON.	Oscilloscope / OUT Both CA and CB Spectrum analyzer  Spec. **A ≧ 35 dB**

RP-70 board (A side)

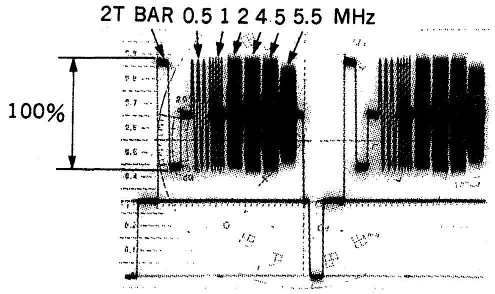
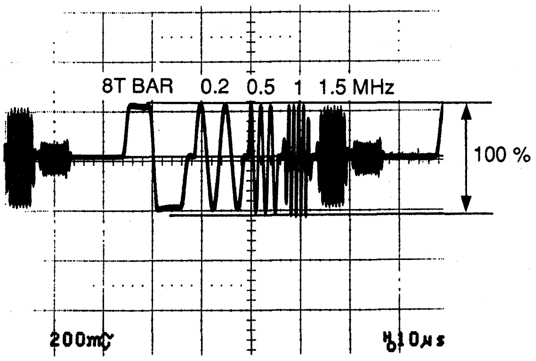

A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV301
RV201
S301
S201
TP303
TP203
TP304
TP204

VP-44 board (A side)

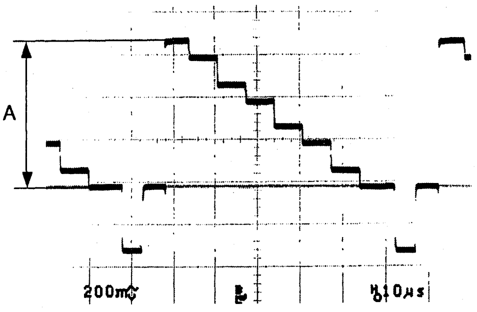

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
TP102

12-7. OVERALL CHECK AND ADJUSTMENT

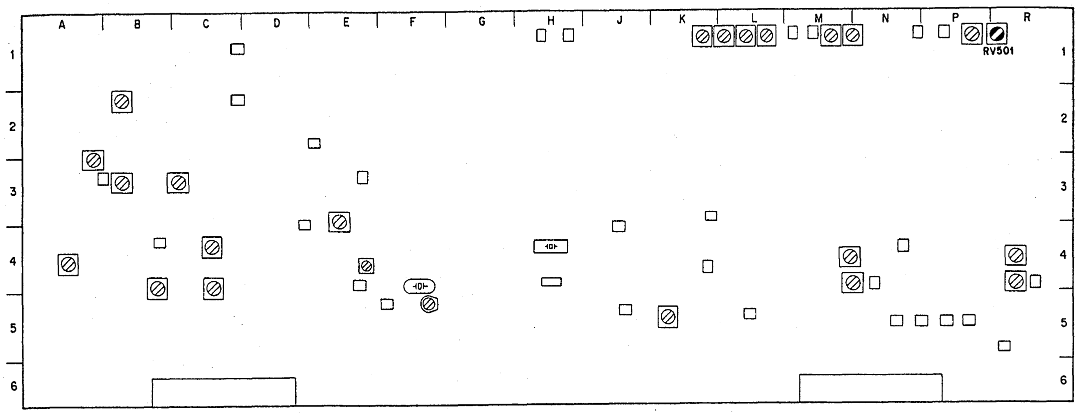
12-7-1. COMPONENT Y and C Overall Frequency Response Check

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • RGB / COMPONENT INPUT; 60 % Multi burst signal • Play back the recorded portion. Blank tape CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) Check the levels for following frequencies. 2T BAR reference 100 % (or 0 dB) **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **4 MHz = 91 % (98 thru 85 %) (– 0.8 ± 0.6 dB)** **5 MHz = 79 % (94 thru 67 %) (– 2 ± 1.5 dB)** (2) Check that both waveforms of CH-A and CH-B satisfied with the specification. (3) Flicker should not be on the monitor picture. (4) When specification is not satisfied, performed the "12-6-1. Y REC current adjustment Step 3" finely.
	RGB / COMPONENT R / R-Y OUT, B / B-Y OUT (75 Ω terminated) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) Check the levels for following frequencies. 8T BAR reference 100 % (or 0 dB) **0.2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1.5 MHz = 87 % (94 thru 78 %) (– $1.2^{+0.6}_{-1.0}$ dB)** (2) Check that both waveforms of CH-A and CH-B satisfied with the specification. (3) When specification is not satisfied, performed the "12-6-2. C REC current adjustment Step 3" finely.

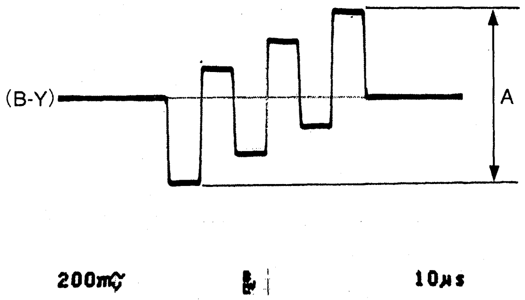
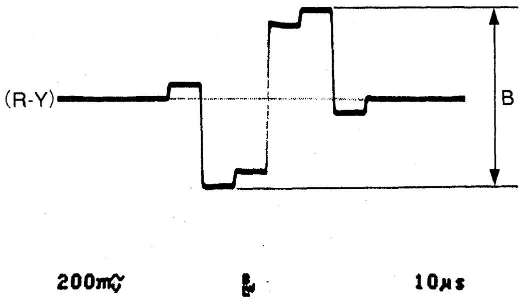
12-7-2. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 1	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV501** / VRA-7 (R-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • Play back the recorded portion. Blank tape CONNECTION 1	Spec. Satisfied the spec. refering Step 1.

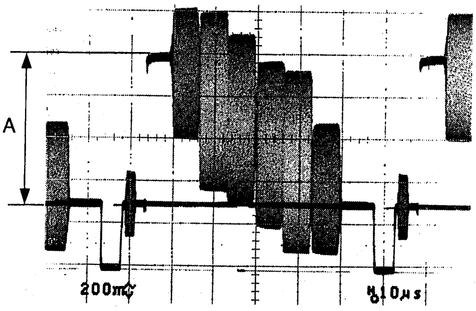
VRA-7 board (A side)



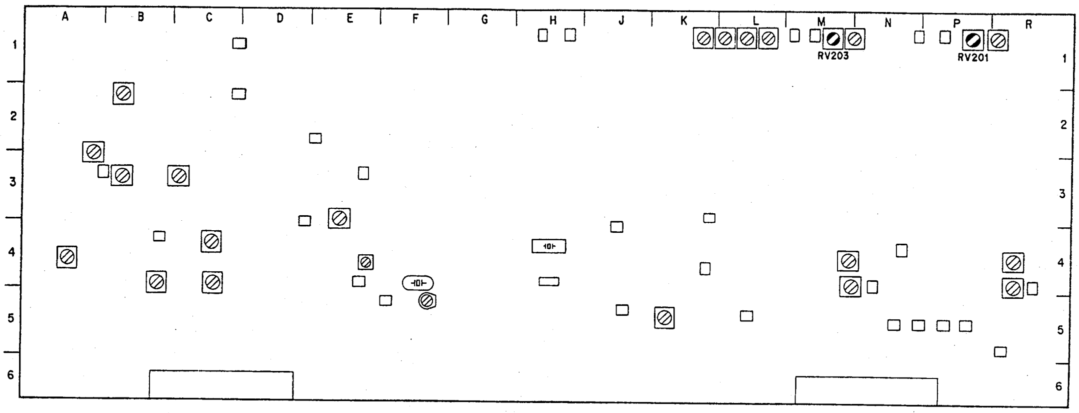
12-7-3. Overall Component R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 1	RGB / COMPONENT B / B-Y, R / R-Y OUT (75 Ω terminated) (A) • (B) CNT-C LEVEL ⊘ **RV203** / VRA-7 (M-1) TRIG : REF. VIDEO WFM or Oscilloscope   Spec. **A = B = 0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • Play back the recorded portion. Blank tape CONNECTION 1	Spec. Satisfied the spec. refering Step 1, B / B-Y and R / R-Y.

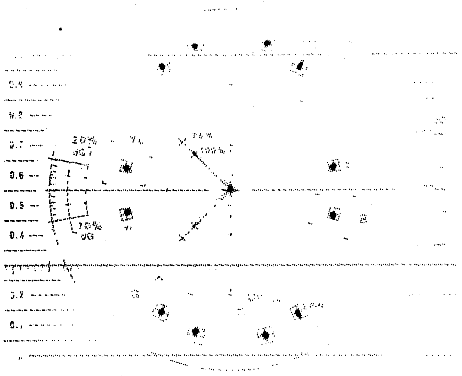
12-7-4. Overall Composite Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV201** / VRA-7 (P-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 2	Spec. Satisfied the spec. refering Step 1.

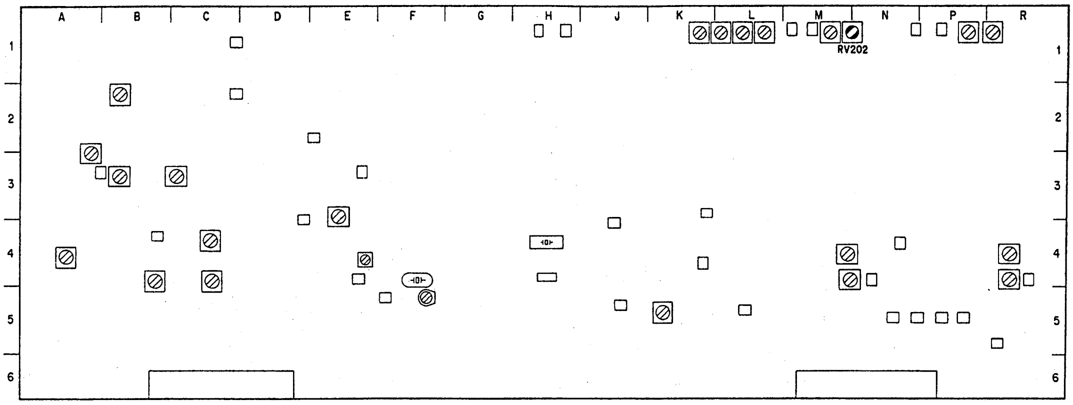
VRA-7 board (A side)



12-7-5. Overall Composite C Level Adjustment

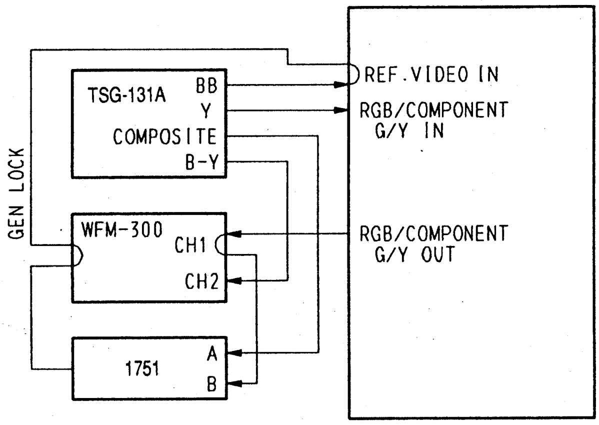
Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst **⊘ PHASE control** / Vector (B) C ST-C LEVEL **⊘ RV202** / VRA-7 (N-1) TRIG : REF. VIDEO Vector  Spec. (A) Set the dot of the burst on the right position on the scale. (B) All dots should be inside the " ⊞" mark on the vector.
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 2	Spec. Satisfied the spec. refering Step 1.

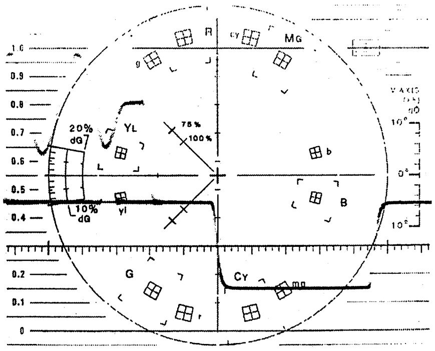
VRA-7 board (A side)



12-7-6. Overall Video Phase Adjustment

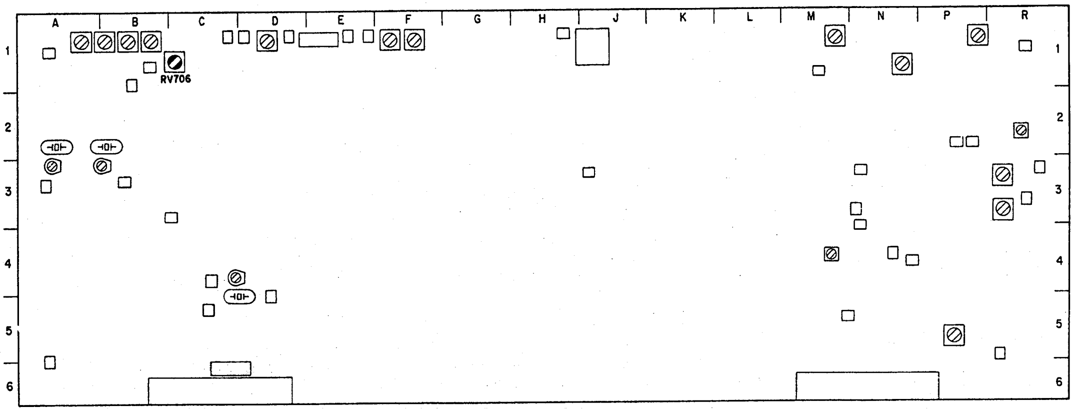
[CONNECTION for Step 1 to 4]


TSG-131A
BB
Y
COMPOSITE
B-Y
GEN LOCK
WFM-300
CH1
CH2
1751
A
B
REF.VIDEO IN
RGB/COMPONENT
G/Y IN
RGB/COMPONENT
G/Y OUT

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • Set the following setting Waveform Vector (1751). WFM mode SWEEP : 1 μs (2H / MAG) FILTER : FLAT EXT REF : EXT GAIN : ×1	CH-A ⊘ **HORIZ POS control** / Vector CH-B ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM WFM mode  Spec. Set the SYNC falling edge to the center.

Continues to the next page.

TBC-28 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV706

12-7-6. Overall Video Phase Adjustment (Continued)

<table>
<tr><th>Conditions for adjustment</th><th>Adjustment point • Specifications</th></tr>
<tr><td>

Step 2

- Do not use the extention board.
- EE mode
- RGB / COMPONENT INPUT ; 50 % Bowtie
- Waveform Vector (1751) ; SCH mode

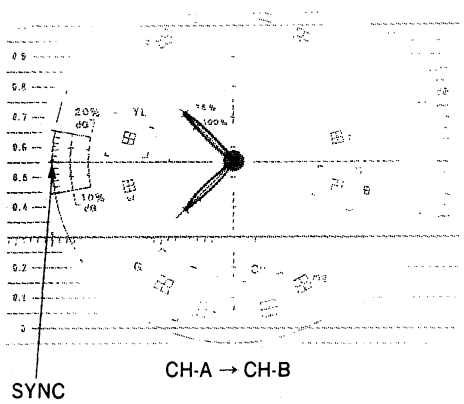
</td><td>

RGB / COMPONENT G / Y OUT (75 Ω terminated)

⊘ **RV706** / TBC-28 (C-1)

TRIG : EXT / WFM

SCH mode

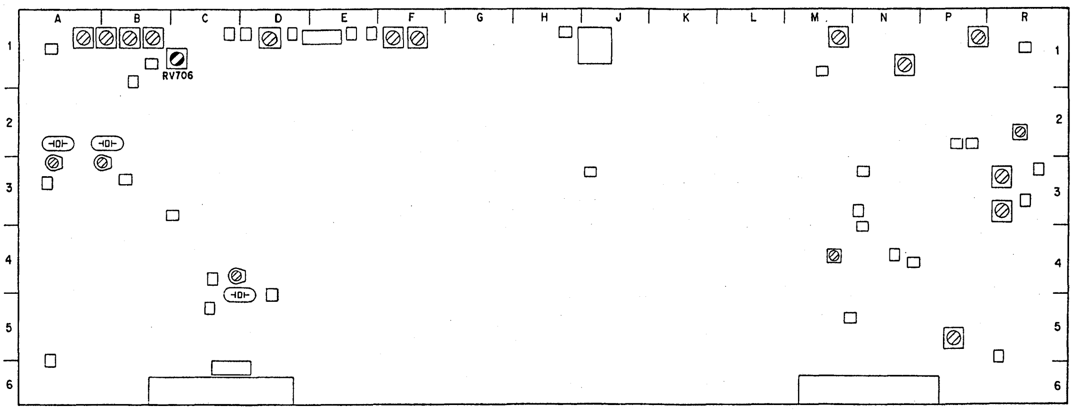


YL
20%
10%
CH-A → CH-B
SYNC

Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above.
Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with RV706.
(**Note :** The dot position should be adjust in the direction of the shortest movement.)

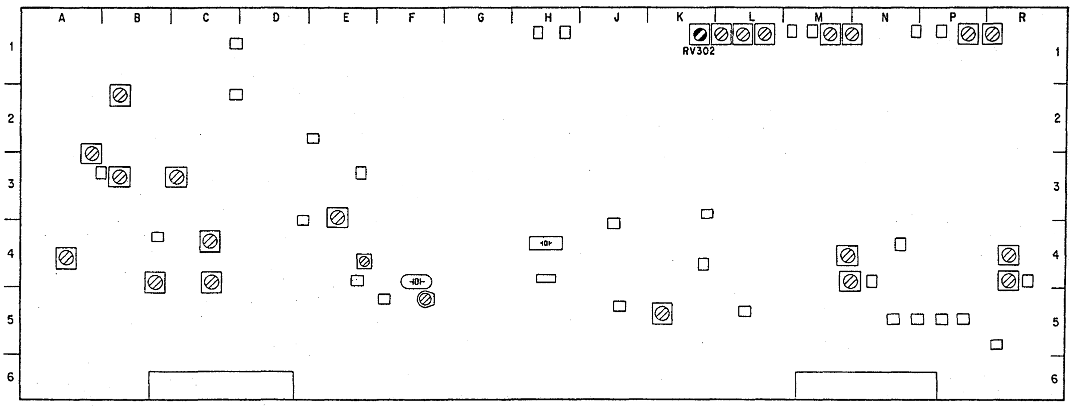
</td></tr>
</table>

TBC-28 board (A side)

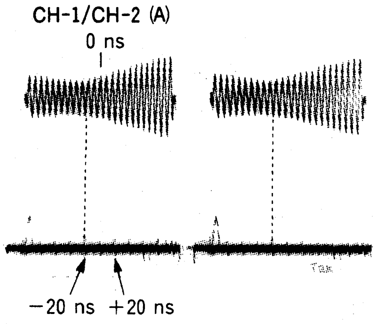
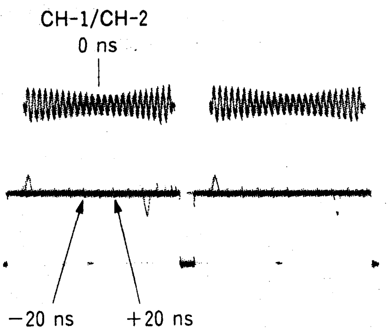


A B C D E F G H J K L M N P R
1 2 3 4 5 6
RV706

VRA-7 board (A side)



A B C D E F G H J K L M N P R
1 2 3 4 5 6
RV302

Conditions for adjustment	Adjustment point • Specifications
Step 3 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • WFM300 ; Bowtie mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV302** / VRA-7 (K-1) TRIG : EXT / WFM Bowtie mode Before adjustment  ⇩ After adjustment  Spec. Set the Bowtie dip point (cross point of the CH-1 / CH-2) on the center marker.
Step 4 • Do not use the extention board. • RGB / COMPONENT INPUT ; 50 % Bowtie • Play back the recorded portion. Blank tape	Spec. difference on Bowtie dip point → **0 ± 20 ns** When specification is not satisfied → Adjust Step 3 again and check that perform Step 4

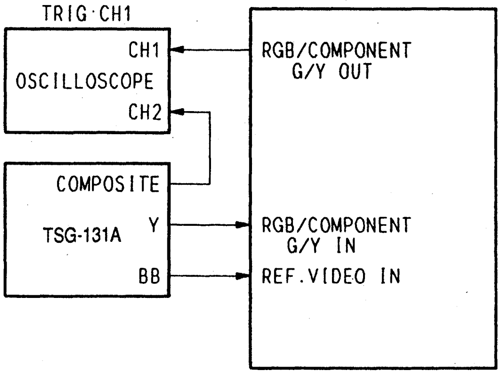
Continues to the next page.

12-7-6. Overall Video Phase Adjustment (Continued)

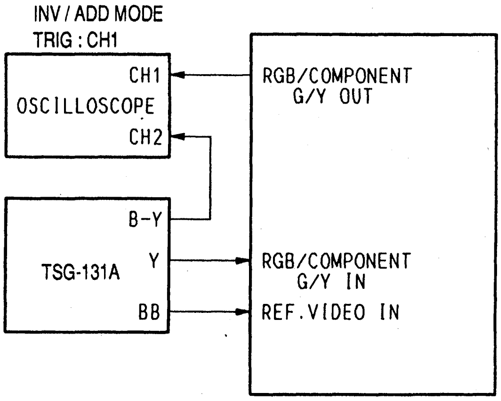
[Reference]

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

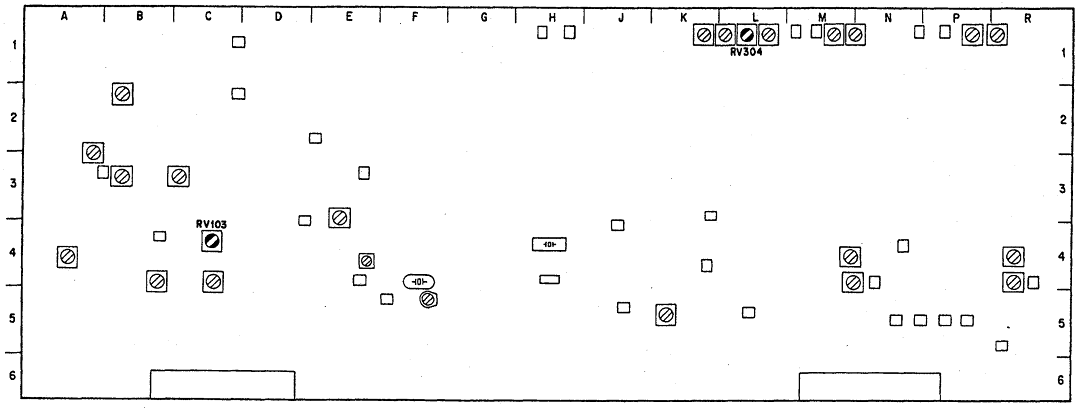
[CONNECTION for Step 1]


TRIG·CH1
CH1
OSCILLOSCOPE
CH2
COMPOSITE
TSG-131A
Y
BB
RGB/COMPONENT G/Y OUT
RGB/COMPONENT G/Y IN
REF.VIDEO IN

[CONNECTION for Step 3 / 4]

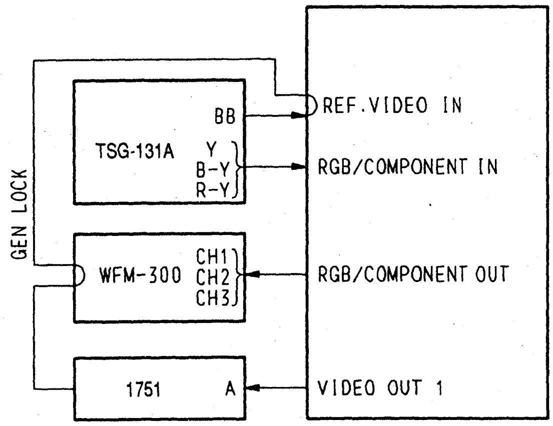

INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
B-Y
TSG-131A
Y
BB
RGB/COMPONENT G/Y OUT
RGB/COMPONENT G/Y IN
REF.VIDEO IN

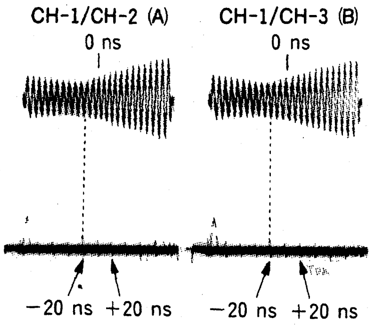
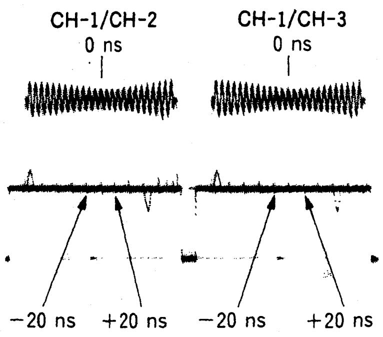
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV304
RV103

12-7-7. Overall Component Y / C Delay Adjustment

[CONNECTION]


TSG-131A
BB
Y
B-Y
R-Y
GEN LOCK
WFM-300
CH1
CH2
CH3
1751
A
REF.VIDEO IN
RGB/COMPONENT IN
RGB/COMPONENT OUT
VIDEO OUT 1

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • WFM300 ; Bowtie mode **Note :** Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.	RGB / COMPONENT OUT (75 Ω terminated) (A) C-C DELAY ⊘ **RV103** / VRA-7 (C-4) (B) CAV Y / C DELAY ⊘ **RV304** / VRA-7 (L-1) TRIG : EXT / WFM Bowtie mode Before adjustment  ⇩ After adjustment  Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. **0 ± 10 ns**

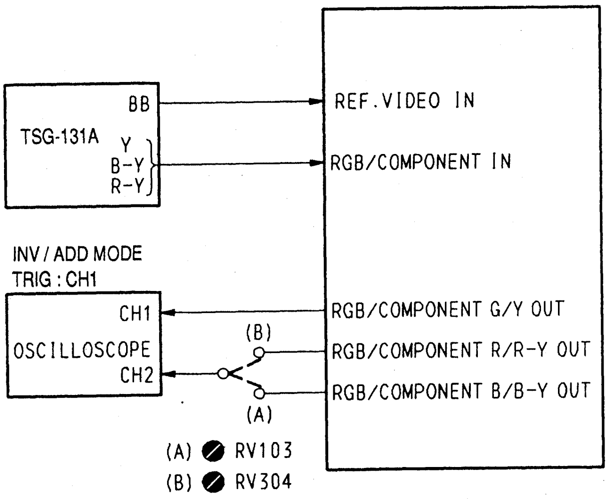
Continues to the next page.

12-7-7. Overall Component Y / C Delay Adjustment (Continued)

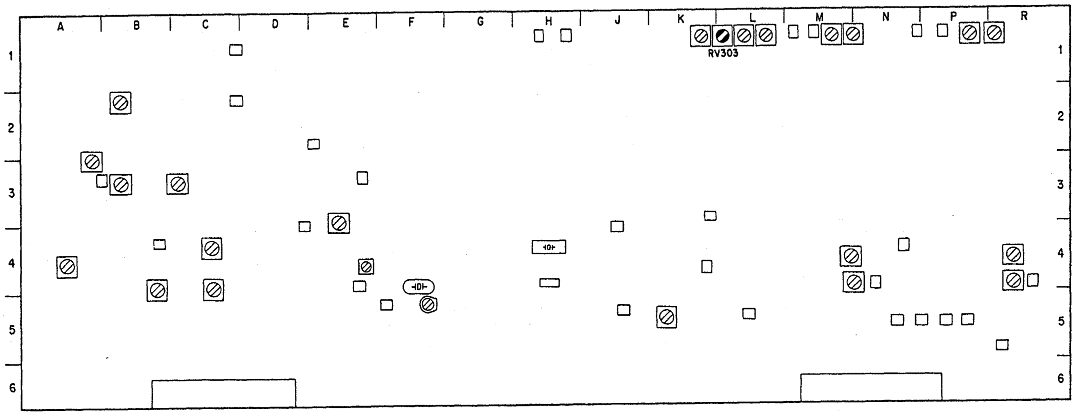
Conditions for adjustment	Adjustment point • Specifications
Step 2 • RGB / COMPONENT INPUT ; 50 % Bowtie • Play back the recorded portion. Blank tape	Spec. difference on Bowtie dip point → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

[Reference]

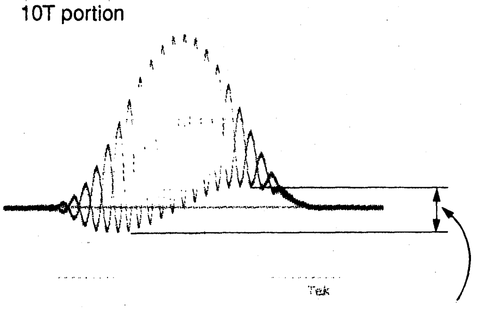
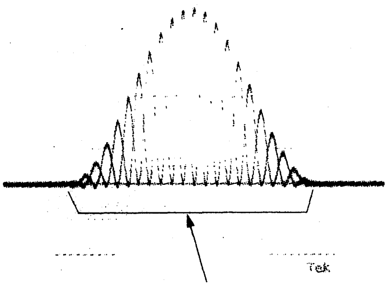
If not prepare the WFM300, connect the oscilloscope following figure for adjust.


BB
TSG-131A
Y
B-Y
R-Y
REF.VIDEO IN
RGB/COMPONENT IN
INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
(B)
(A)
RGB/COMPONENT G/Y OUT
RGB/COMPONENT R/R-Y OUT
RGB/COMPONENT B/B-Y OUT
(A) RV103
(B) RV304

VRA-7 board (A side)

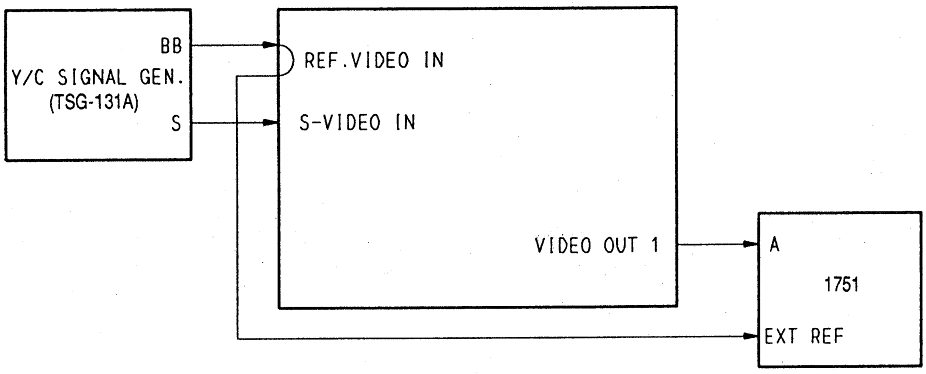

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV303

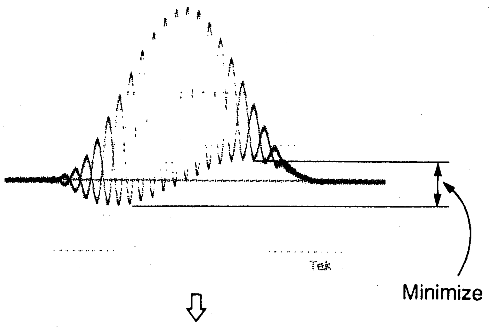
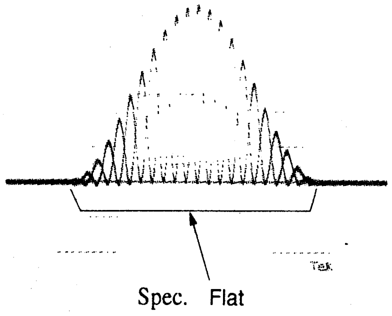
12-7-8. Overall Composite Y / C Delay Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE Pulse & Bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 2	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV303** / VRA-7 (L-1) TRIG : REF. VIDEO WFM Before adjustment  ⇩ After adjustment  Spec. Flat (If the readjustment is performed after Step 2, compensate the deviation measured in Step 2.)
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE Pulse & Bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 2	Spec. difference from at center → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

12-7-9. Overall S-VIDEO Y / C Delay Adjustment

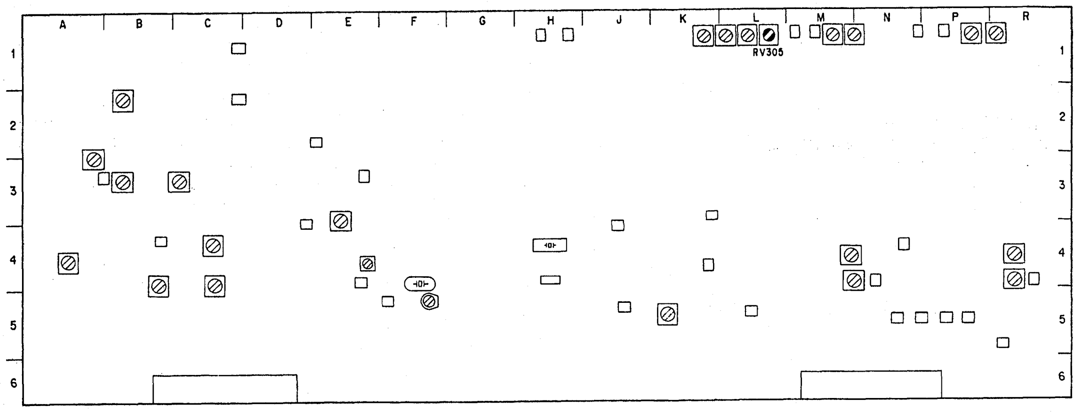
[CONNECTION]


BB
Y/C SIGNAL GEN.
(TSG-131A)
S
REF.VIDEO IN
S-VIDEO IN
VIDEO OUT 1
A
1751
EXT REF

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • S-VIDEO INPUT ; S-VIDEO Pulse & Bar • VIDEO IN switch / Sub control panel ; S-VIDEO	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV305** / VRA-7 (L-1) TRIG : EXT / WFM WFM Before adjustment 10T portion  ⇩ After adjustment 

Conditions for adjustment	Adjustment point • Specifications
Step 2 • Do not use the extention board. • S-VIDEO INPUT ; S-VIDEO Pulse & Bar • VIDEO IN switch / Sub control panel ; S-VIDEO • Play back the recorded portion. Blank tape	Spec. difference from center → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

VRA-7 board (A side)



SECTION 13
ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

Electrical adjustments are greatly simplified when circuit board is replaced. Refer to this section, not sections 9 through 12, for adjustment when circuit board is replaced which requires adjustment and / or setting.

This section provides the minimum but sufficient adjustment procedure for this purpose.

Some circuit boards require adjustment and / or resetting using the maintenance mode even though any electrical adjustment devices are not mounted on the circuit boards.

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
    - Audio SG (HP 8904 or equivalent)
    - Component SG (TEKTRONIX TSG-131A op. 03 or equivalent)
    - Composite SG (TEKTRONIX TSG-131A op. 03 or equivalent)
    - Y / C (TEKTRONIX TSG-131A op. 03 or equivalent)
- Audio Level Meter (HP 3400A or equivalent)
- Waveform Monitor (WFM)
    - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 (op. SC) or equivalent)
    - Composite (TEKTRONIX 1751 / 1781 / 1765 (op. SC) or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
- Sweep Generator (SHIBASOKU VS-12CX or equivalent)
- Picture Monitor
- Frequency Counter
- Current Probe (TEKTRONIX P6022 or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent

  Note : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)
- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Contents

TIME min. s	AUDIO TRACK
0 : 00 3 : 00	1 kHz / 0 VU
5 : 00	15 kHz / 0 VU
6 : 00	1 kHz / – 20 VU
6 : 30	40 kHz / – 20 VU
7 : 00	7 kHz / – 20 VU
7 : 30	10 kHz / – 20 VU
8 : 00	15 kHz / – 20 VU

∗ 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (+ 4 dB) should be corrected according to the correction value as follows.

example) Correction value = – 0.5 dB
Output level = + 4 dB – 0.5 dB = + 3.5 dB

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Sub Control Panel>
VIDEO IN : COMPONENT
: Y-R, B
REMOTE / LOCAL : LOCAL
CTL / LTC / U-BIT : LTC
CHARACTER : ON
COMPONENT OUT : Y-R, B

<Connector Panel>
AUDIO INPUT CH-1 600 Ω : ON
AUDIO INPUT CH-2 600 Ω : ON

<Switch Setting on Printed Circuit Board>
S201-2 / SS-61 : CLOSE (ON) · · · · NR OFF

SECTION 13
ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

Electrical adjustments are greatly simplified when circuit board is replaced. Refer to this section, not sections 9 through 12, for adjustment when circuit board is replaced which requires adjustment and / or setting.
This section provides the minimum but sufficient adjustment procedure for this purpose.
Some circuit boards require adjustment and / or resetting using the maintenance mode even though any electrical adjustment devices are not mounted on the circuit boards.

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
  - Audio SG (HP 8904 or equivalent)
  - Component SG (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Composite SG (TEKTRONIX TSG-131A op. 03 or equivalent)
  - Y / C (TEKTRONIX TSG-131A op. 03 or equivalent)
- Audio Level Meter (HP 3400A or equivalent)
- Waveform Monitor (WFM)
  - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 (op. SC) or equivalent)
  - Composite (TEKTRONIX 1751 / 1781 / 1765 (op. SC) or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
- Sweep Generator (SHIBASOKU VS-12CX or equivalent)
- Picture Monitor
- Frequency Counter
- Current Probe (TEKTRONIX P6022 or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent

Note : "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.

- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)
- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Contents

TIME min. s	AUDIO TRACK
0 : 00	
	1 kHz / 0 VU
3 : 00	
	15 kHz / 0 VU
5 : 00	
	1 kHz / – 20 VU
6 : 00	
	40 kHz / – 20 VU
6 : 30	
	7 kHz / – 20 VU
7 : 00	
	10 kHz / – 20 VU
7 : 30	
	15 kHz / – 20 VU
8 : 00	

* 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (+ 4 dB) should be corrected according to the correction value as follows.

example) Correction value = – 0.5 dB
Output level = + 4 dB – 0.5 dB = + 3.5 dB

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Sub Control Panel>
VIDEO IN : COMPONENT
: Y-R, B
REMOTE / LOCAL : LOCAL
CTL / LTC / U-BIT : LTC
CHARACTER : ON
COMPONENT OUT : Y-R, B

<Connector Panel>
AUDIO INPUT CH-1 600 Ω : ON
AUDIO INPUT CH-2 600 Ω : ON

<Switch Setting on Printed Circuit Board>
S201-2 / SS-61 : CLOSE (ON) · · · · NR OFF

AP-31 BOARD

1. PB MODE ADJUSTMENT

1-1. PB Dolby off Frequency Response Adjustment

<table>
<tr><th>Conditions for adjustment</th><th>Adjustment point • Specifications</th></tr>
<tr><td>• PB mode
1 kHz, 7 kHz, 10 kHz,
15 kHz, – 20 VU / CR8-1B PS
(5 : 00 – 8 : 00)

CONNECTION 1</td><td>AUDIO OUTPUT CH-1 / 2

CH-1
⊘ RV1 (10 kHz) / AP-31 (J-1)
⊘ RV2 (7 kHz) / AP-31 (J-1)

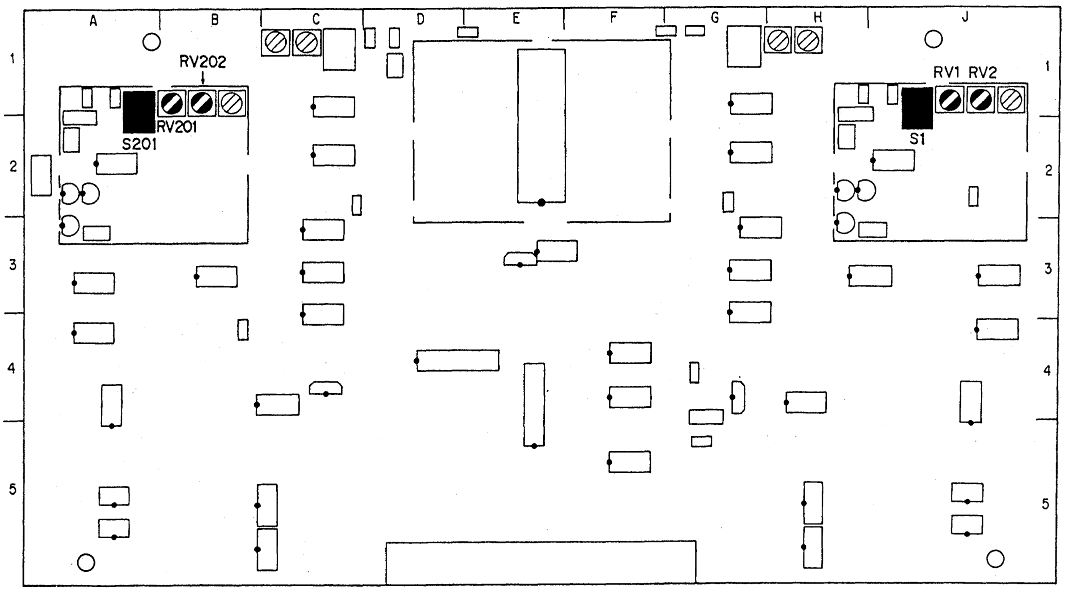
CH-2
⊘ RV201 (10 kHz) / AP-31 (B-1)
⊘ RV202 (7 kHz) / AP-31 (B-1)

Adjust alternately

If the specification of the high frequency is not satisfied, change the following switches and adjust again.
CH-1 S1 / AP-31 (J-1)
CH-2 S201 / AP-31 (A-1)

Spec.
<table>
<tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr>
<tr><td>1 k</td><td>0 (REF)</td></tr>
<tr><td>7 k</td><td>0 ± 0.2</td></tr>
<tr><td>10 k</td><td>0 ± 0.2</td></tr>
<tr><td>15 k</td><td>– 0.5 ± 0.5</td></tr>
</table></td></tr>
</table>

AP-31 board (A side)

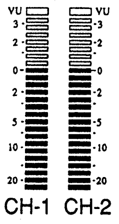


1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 1 kHz, 0 VU / CR8-1B PS (0 : 00 – 3 : 00) CONNECTION 1	CH-1 TP5 / AP-31 (G-1) ⊘ **RV3** / AP-31 (J-1) CH-2 TP205 / AP-31 (D-1) ⊘ **RV203** / AP-31 (B-1) Spec. **– 10.0 ± 0.1 dBu** [Check] AUDIO OUTPUT CH-1 / 2 Spec. **+ 4.0 ± 0.2 dBu**

2. EE MODE ADJUSTMENT

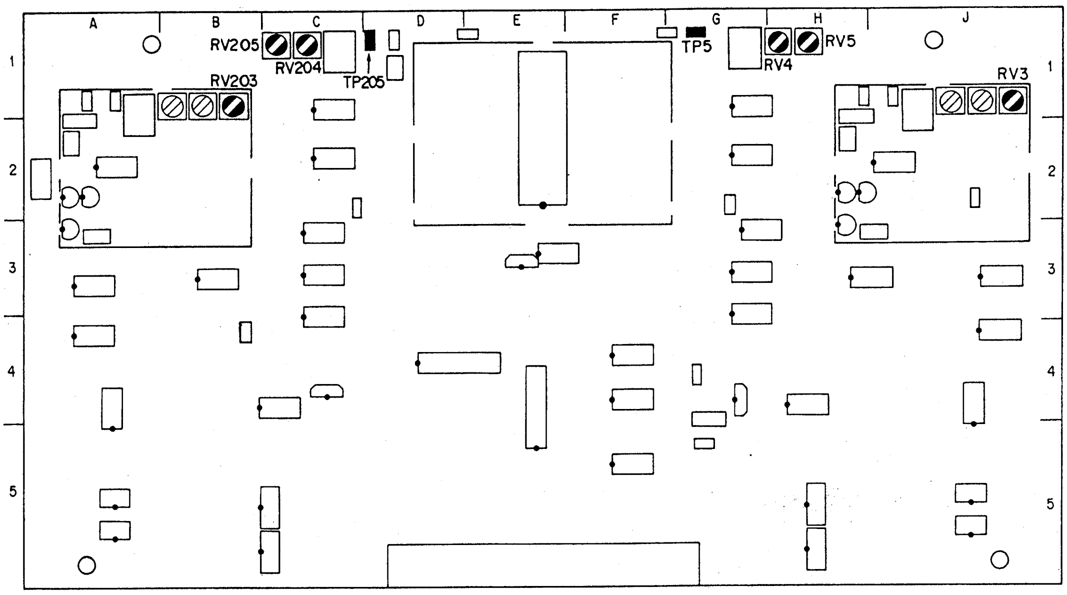
2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4.00 dBu • EE mode CONNECTION 1	Step 1 CH-1 TP5 / AP-31 (G-1) ⊘ **REC VR** / Sub Control Panel CH-2 TP205 / AP-31 (D-1) ⊘ **REC VR** / Sub Control Panel Spec. **– 10.00 ± 0.05 dBu** Step 2 AUDIO METER ⊘ **RV5** / AP-31 (H-1) ⊘ **RV205** / AP-31 (C-1)  VU 3 2 0 2 5 10 20 VU 3 2 0 2 5 10 20 CH-1 CH-2 Spec. The segment one step above 0 VU should be dimly lit

2-2. EE Output Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4.0 dBu • EE mode CONNECTION 1	AUDIO OUTPUT CH-1 / 2 CH-1: ⊘ **RV4** / AP-31 (H-1) CH-2: ⊘ **RV204** / AP-31 (C-1) Spec. **+ 4.0 ± 0.2 dBu**

AP-31 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV205
RV204
RV203
TP205
TP5
RV5
RV4
RV3

AR-14 BOARD

3. REC MODE ADJUSTMENT

3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications	
• AUDIO INPUT CH-1 / 2 ; No signal • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) ⊘ **LV101** / AR-14 (C-2)	CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) ⊘ **LV201** / AR-14 (A-2)
CONNECTION 1	Spec. **The leak of bias → Minimize (≦ – 30 dBu)**	

3-2. Bias Current Adjustment

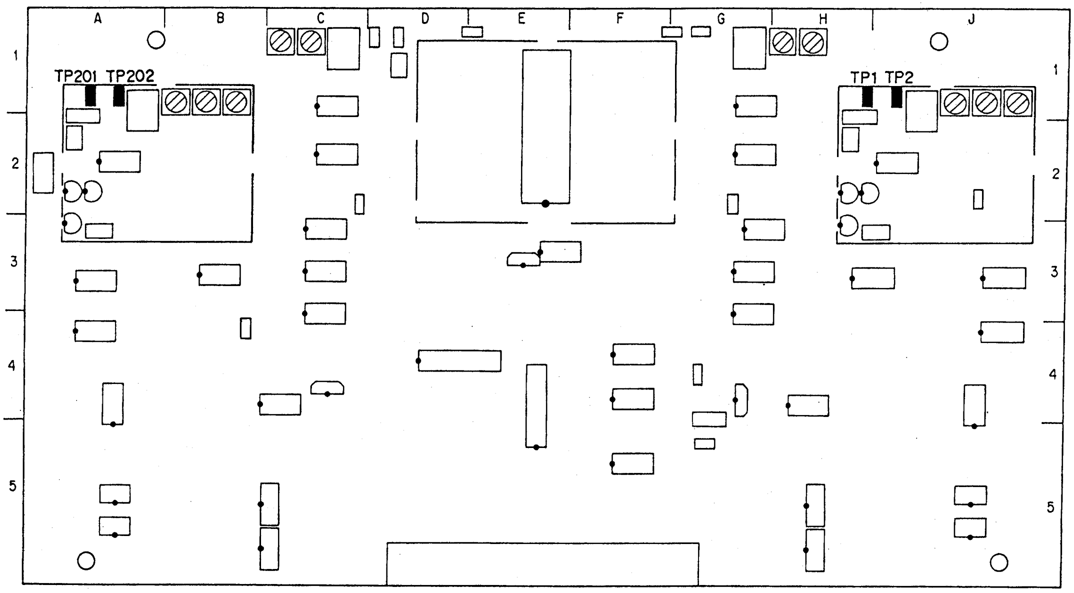
Conditions for adjustment	Adjustment point • Specifications	
• AUDIO INPUT CH-1 / 2 ; No signal • REC mode Blank tape	Step 1 TP1 / AP-31 (H-1) GND : TP2 (J-1) ⊘ **T101** / AR-14 (C-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⊘ **T201** / AR-14 (A-4)
	Spec. **Bias current → Maximize**	
	Step 2 TP1 / AP-31 (H-1) GND : TP2 (J-1) ⊘ **RV301** / AR-14 (B-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) ⊘ **RV302** / AR-14 (B-4)
CONNECTION 1	Spec. **15 ± 1 mV rms**	

4. OVERALL ADJUSTMENT

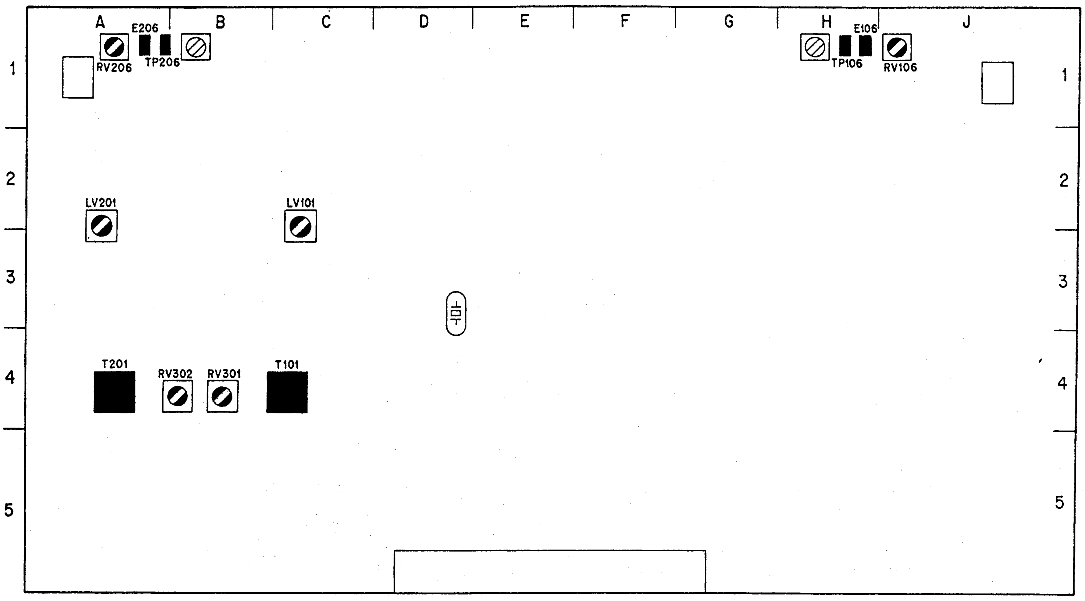
4-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4 dBu • Playback the recorded portion. Blank tape CONNECTION 1	AUDIO OUTPUT CH-1 / 2 Spec. **+ 4.0 ± 0.5 dBu** When specification is not satisfied → Step 2
Step 2 • AUDIO INPUT CH-1 / 2 ; 1 kHz, + 4 dBu • REC mode Blank tape CONNECTION 1	CH-1 TP106 / AR-14 (H-1) ⊘ **RV106** / AR-14 (J-1) CH-2 TP206 / AR-14 (A-1) ⊘ **RV206** / AR-14 (A-1) Correct the difference level from the center value in Step 1. After the adjustment, check that perform Step 1.

AP-31 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
TP201 TP202
TP1 TP2

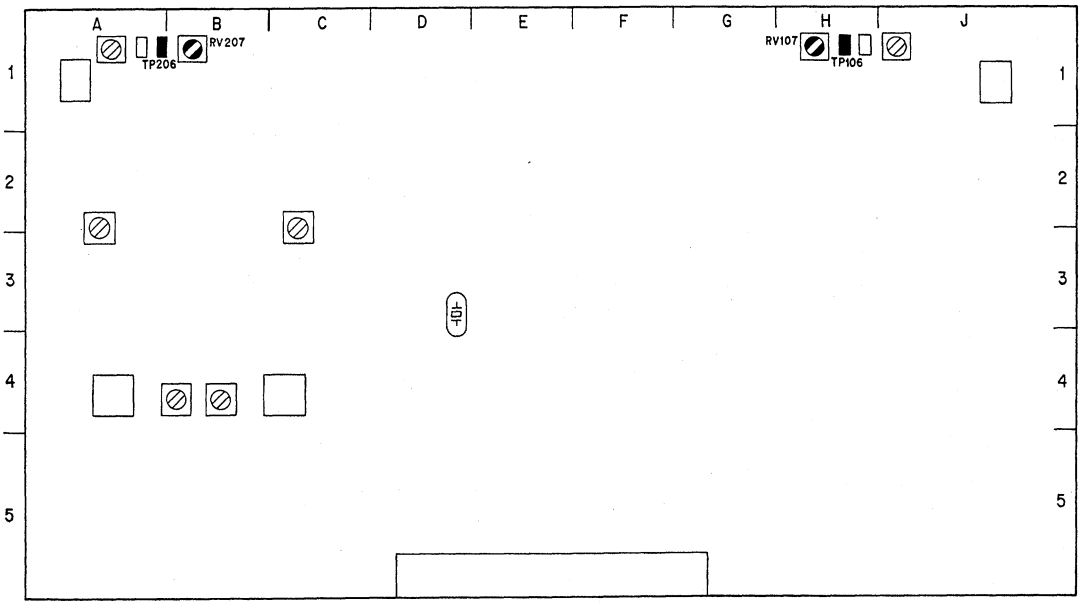
AR-14 board (A side)


A
B
C
D
E
F
G
H
J
1
2
3
4
5
E206
RV206
TP206
E106
TP106
RV106
LV201
LV101
T201
RV302
RV301
T101

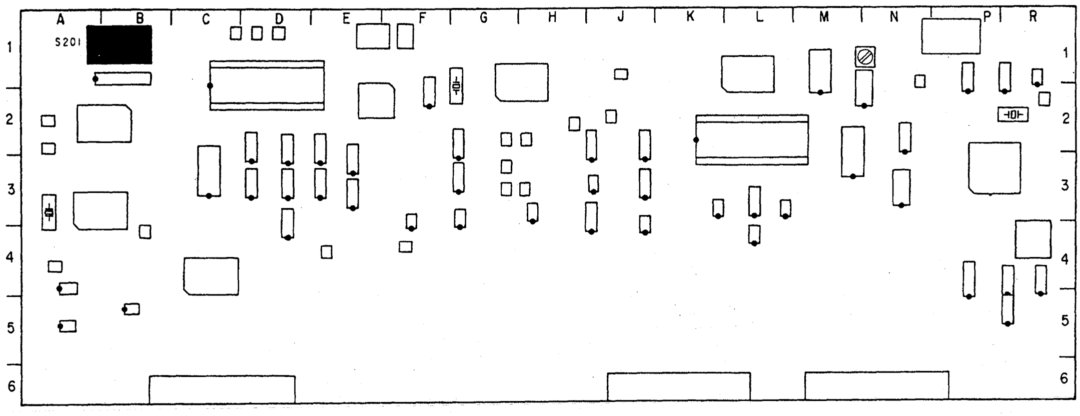
4-2. Overall Frequency Response Adjustment (Dolby on)

Conditions for adjustment	Adjustment point • Specifications
Step 1 • AUDIO INPUT CH-1 / 2 ; 12.5 kHz, + 4 dBu • S201-2 / SS-61 (B-1) ; OPEN (OFF) ···· NR ON • Play back the recorded portion. Blank tape CONNECTION 1	AUDIO OUTPUT CH-1 / 2 Spec. + **3.5 ± 0.5 dBu** When specification is not satisfied → Step 2
Step 2 • AUDIO INPUT CH-1 / 2 ; 12.5 kHz, + 4 dBu • S201-2 / SS-61 (B-1) ; OPEN (OFF) ···· NR ON • REC mode Blank tape CONNECTION 1	CH-1 TP106 / AR-14 (H-1) ⊘ **RV107** / AR-14 (H-1) CH-2 TP206 / AR-14 (A-1) ⊘ **RV207** / AR-14 (B-1) Correct the difference level × 0.8 from the center value in Step 1. After the adjustment, check that perform Step 1.

AR-14 board (A side)

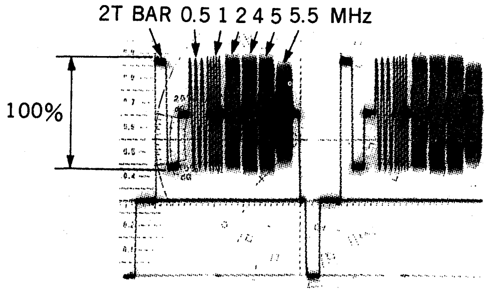
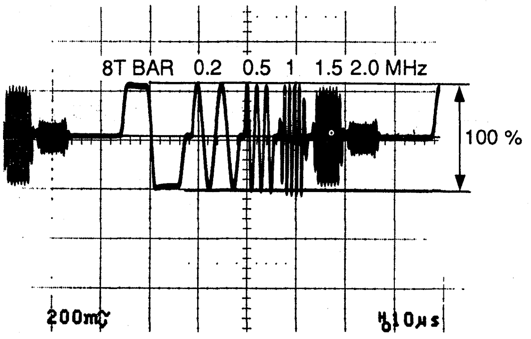

A
B
C
D
E
F
G
H
J
1
2
3
4
5
RV207
TP206
RV107
TP106

SS-61 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
S201

RP-70 BOARD

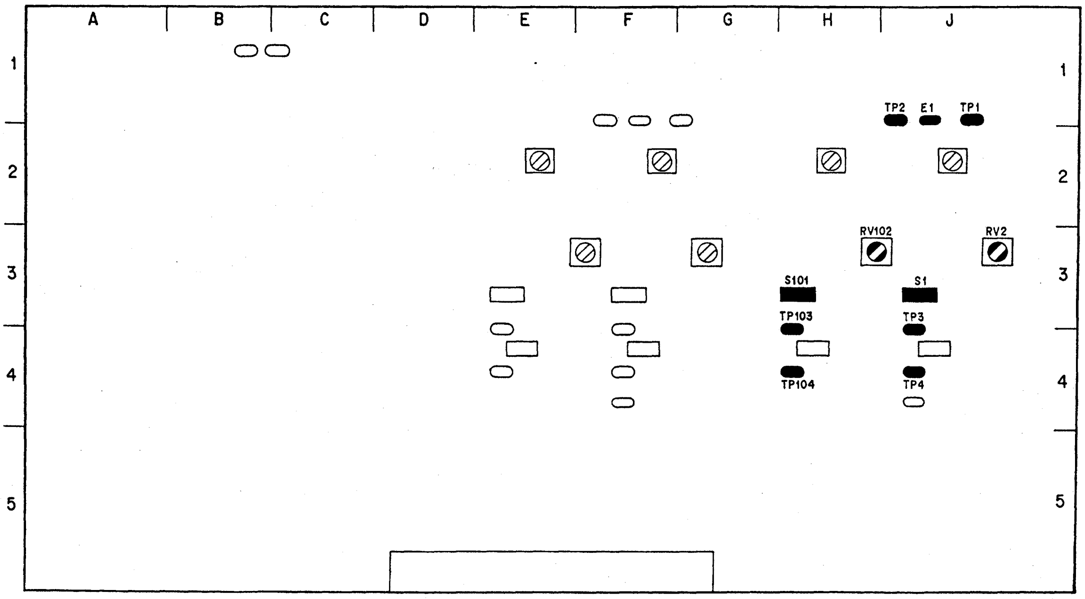
1. Component Y and C Overall Frequency Response Check

Conditions for adjustment	Adjustment point • Specifications
• RGB / COMPONENT INPUT ; 60 % Multi burst signal • Play back the recorded portion. Blank tape CONNECTION 2	RGB / COMPONENT G / Y OUT (75 Ω terminated) TRIG : REF. VIDEO · WFM or Oscilloscope  Spec. (1) Check the levels for following frequencies. 2T BAR reference 100 % (or 0 dB) **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **4 MHz = 91 % (98 thru 85 %) (– 0.8 ± 0.6 dB)** **5 MHz = 79 % (94 thru 67 %) (– 2.0 ± 1.5 dB)** (2) Check that both waveforms of CH-A and CH-B satisfied with the specification. (3) Flicker should not be on the monitor picture. (4) When specification is not satisfied, performed the "3. Y REC current adjustment Step 3" finely.
	RGB / COMPONENT R / R-Y, B / B-Y OUT (75 Ω terminated) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) Check the levels for following frequencies. 8T BAR reference 100 % (or 0 dB) **0.2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1.5 MHz = 87 % (94 thru 78 %) (– 1.2 $^{+0.6}_{-1.0}$dB)** (2) Check that both waveforms of CH-A and CH-B satisfied with the specification. (3) When specification is not satisfied, performed the "4. C REC current adjustment Step 2" finely.

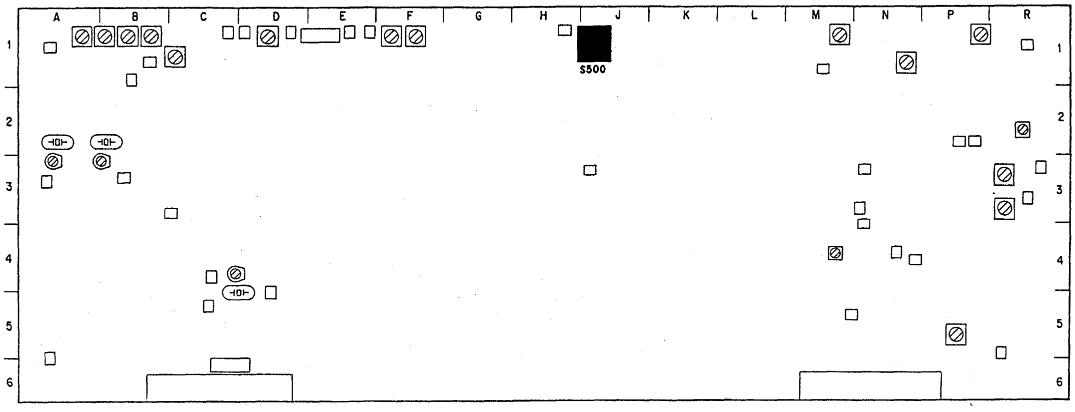
2. Component Y and C Overall Over Modulation Check

Conditions for adjustment	Adjustment point • Specifications
• RGB / COMPONENT INPUT ; H Sweep signal (125 %) • Connect a color monitor to VIDEO OUT 2 • Play back the recorded portion. Blank tape CONNECTION 2	VIDEO OUT 2 Spec. (1) Playback : Over modulation should not be on the monitor picture. (2) Still : Over modulation should not be on the center of the monitor picture. When specifications are not satisfied → Perform the head friction check. Head friction is not serious, perform the check in Section 12-5-14. Y Deviation Adjustment, Section 12-5-15.C Deviation Adjustment. When specifications are not satisfied after checking, perform as follows : 3. Y REC Current Adjustment Step 3, 4. C REC Current Adjustment Step 3. And performing increase or decrease within the specification.
• RGB / COMPONENT INPUT ; H Sweep signal (100 %) • S500-2 / TBC-28 (J-1) ; CLOSE (ON)· · · Y MUTE • Connect a color monitor to VIDEO OUT 2 • Play back the recorded portion. Blank tape • After check is completed, set S500-2 / TBC-28 to OFF. CONNECTION 2	VIDEO OUT 2 Spec. (1) Playback : Over modulation should not be on the monitor picture. (2) Still : Over modulation should not be on the center of the monitor picture.

RP-70 board (A side)

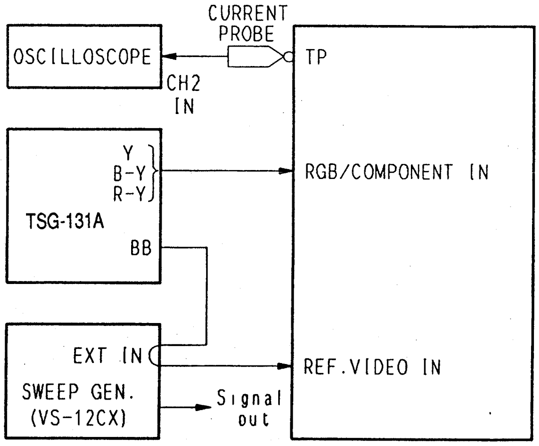


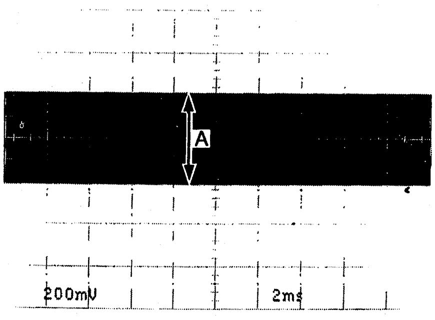
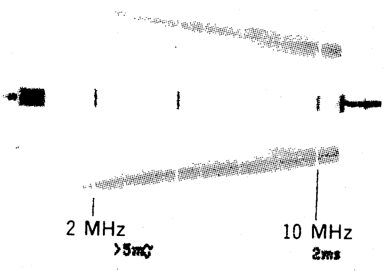
TBC-28 board (A side)

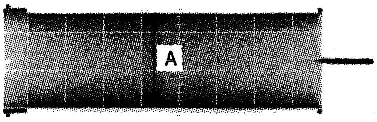


3. Y REC Current Adjustment

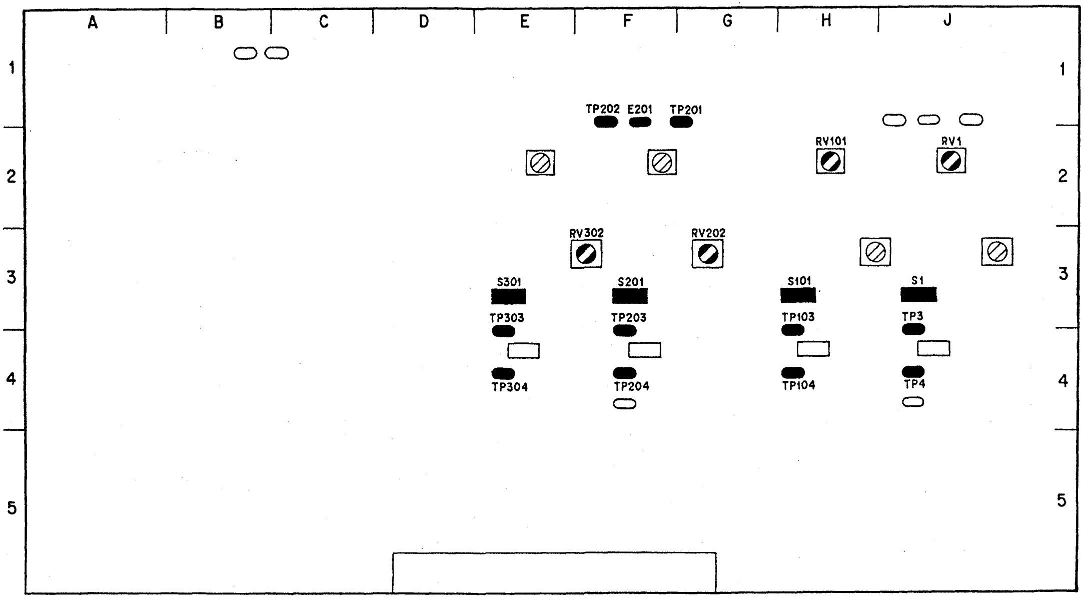
[CONNECTION for Step 1, 2]


CURRENT PROBE
OSCILLOSCOPE
CH2 IN
TP
Y
B-Y
R-Y
TSG-131A
BB
RGB/COMPONENT IN
EXT IN
SWEEP GEN.
(VS-12CX)
Signal out
REF.VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • Connect TP1-E1 / RP-70 (J-1) (J-1) with a shorting clip. • Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1).	TP2 / RP-70 (J-1) ⊘ **Level control** / sweep generator TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.40 ± 0.02 V at 5 MHz**
Step 2 • S1, S101 / RP-70 (J-3) (H-3) ; OPEN (OFF) • Short TP1-E1 / RP-70 (J-1) (J-1) with a shorting clip. • Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1). • Connect TP3-TP4 / RP-70 (J-3) (J-4) and TP103-TP104 / RP-70 (H-3) (H-4) with a shorting clip and measure with current probe. • REC mode Blank tape • After adjustment is completed, remove the shorting clip connected between TP1-E1 and sweep signal input.	YA TP3-TP4 / RP-70 (J-3) (J-4) ⊘ **RV2** / RP-70 (J-3) YB TP103-TP104 / RP-70 (H-3) (H-4) ⊘ **RV102** / RP-70 (H-3) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. 2 MHz reference (100 %) **10 MHz = 65^{+20}_{-10} %**

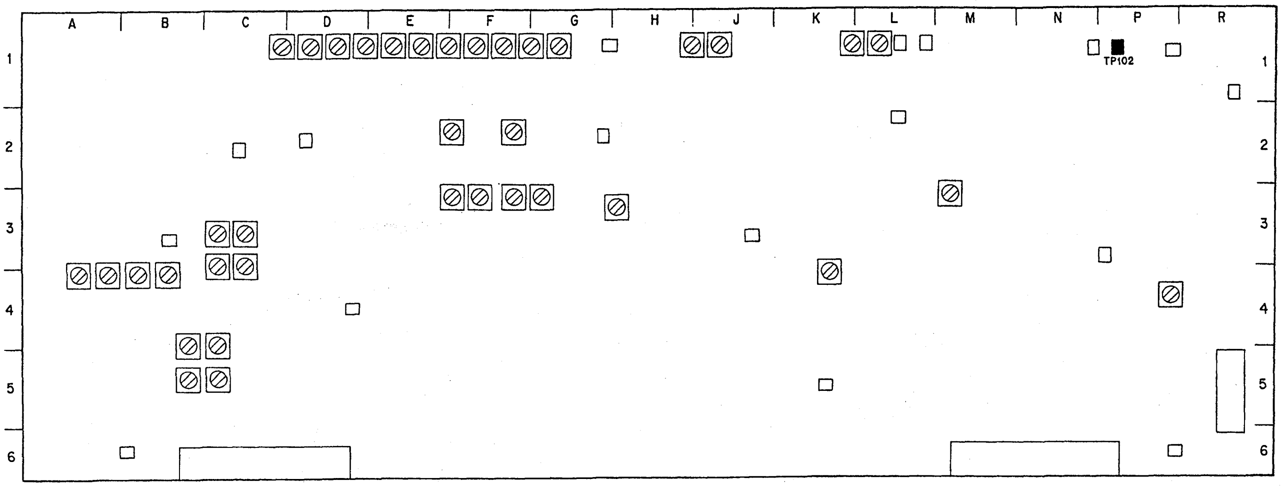
Conditions for adjustment	Adjustment point • Specifications
Step 3 - RGB / COMPONENT INPUT ; COMPONENT 50 % Flat field - REC mode Blank tape - After adjustment is completed, remove the current probe connected TP3-TP4, TP103-TP104 and set S1, S101 / RP-70 to ON.	YA TP3-TP4 / RP-70 (J-3) (J-4) ⊘ **RV1** / RP-70 (J-2) YB TP103-TP104 / RP-70 (H-3) (H-4) ⊘ **RV101** / RP-70 (H-2) TRIG : TP102 / VP-44 (P-1) Oscilloscope  20mV 2ms Spec. **A = 45 ± 10 mA**

RP-70 board (A side)



A
B
C
D
E
F
G
H
J
1
2
3
4
5
TP202
E201
TP201
RV101
RV1
RV302
RV202
S301
S201
S101
S1
TP303
TP203
TP103
TP3
TP304
TP204
TP104
TP4

VP-44 board (A side)



A
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3
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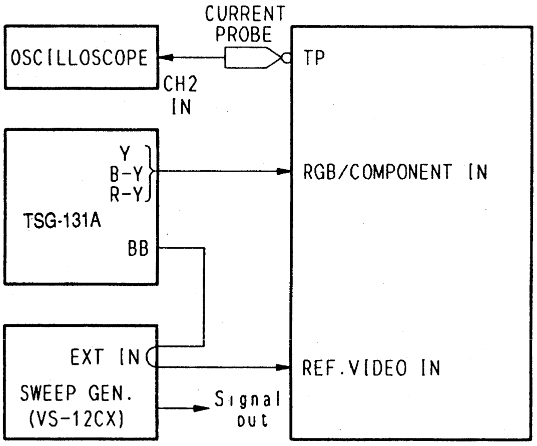
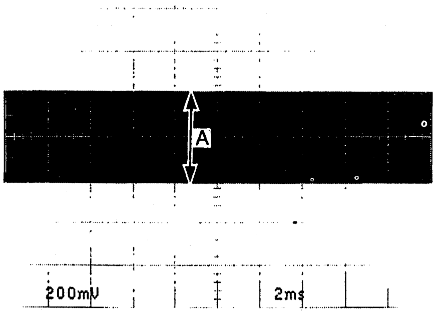
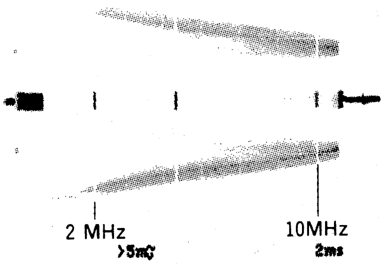
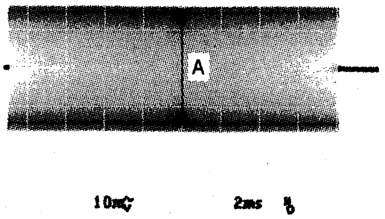
6
TP102

4. C REC Current Adjustment

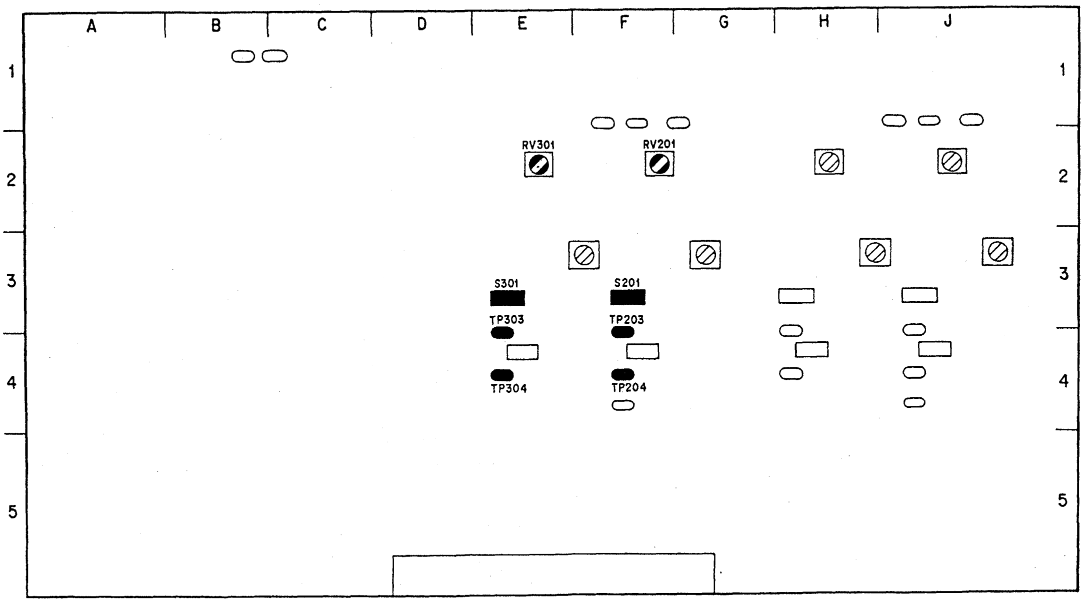
[CONNECTION for Step 1, 2]


CURRENT PROBE
OSCILLOSCOPE
CH2 IN
TP
TSG-131A
Y
B-Y
R-Y
BB
RGB/COMPONENT IN
EXT IN
SWEEP GEN. (VS-12CX)
Signal out
REF.VIDEO IN

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • Short TP201 – E201 / RP-70 (G-1) (F-1) with a short clip. • Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1).	TP202 / RP-70 (F-1) ⊘ **Level control** / sweep generator TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 0.40 ± 0.02 V at 5 MHz**
Step 2 • S201, S301 / RP-70 (F-3) (E-3) ; OPEN (OFF) • Short TP201-E201 / RP-70 (G-1) (F-1) with a short clip. • Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1). • Connect TP203-TP204 / RP-70 (F-3) (F-4) and TP303-TP304 / RP-70 (E-3) (E-4) with a shorting clip and measure with current probe. • REC mode Blank tape • After adjustment is completed, remove the short cilp connected between TP201-E201 and sweep signal input.	CA TP203-TP204 / RP-70 (F-3) (F-4) ⊘ **RV202** / RP-70 (G-3) CB TP303-TP304 / RP-70 (E-3) (E-4) ⊘ **RV302** / RP-70 (F-3) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. 2 MHz reference (100 %) **10 MHz = 60^{+30}_{-20} %**

Conditions for adjustment	Adjustment point • Specifications
Step 3 • RGB / COMPONENT INPUT ; COMPONENT 50 % Flat field • REC mode Blank tape • After adjustment is completed, remove the current probe connected TP203-TP204, TP303-TP304 and set S201, S301 / RP-70 to ON.	CA TP203-TP204 / RP-70 (F-3) (F-4) ⊘ **RV201** / RP-70 (F-2) CB TP303-TP304 / RP-70 (E-3) (E-4) ⊘ **RV301** / RP-70 (E-2) TRIG : TP102 / VP-44 (P-1) Oscilloscope  Spec. **A = 50 ± 10 mA**

RP-70 board (A side)


A
B
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D
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G
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J
1
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4
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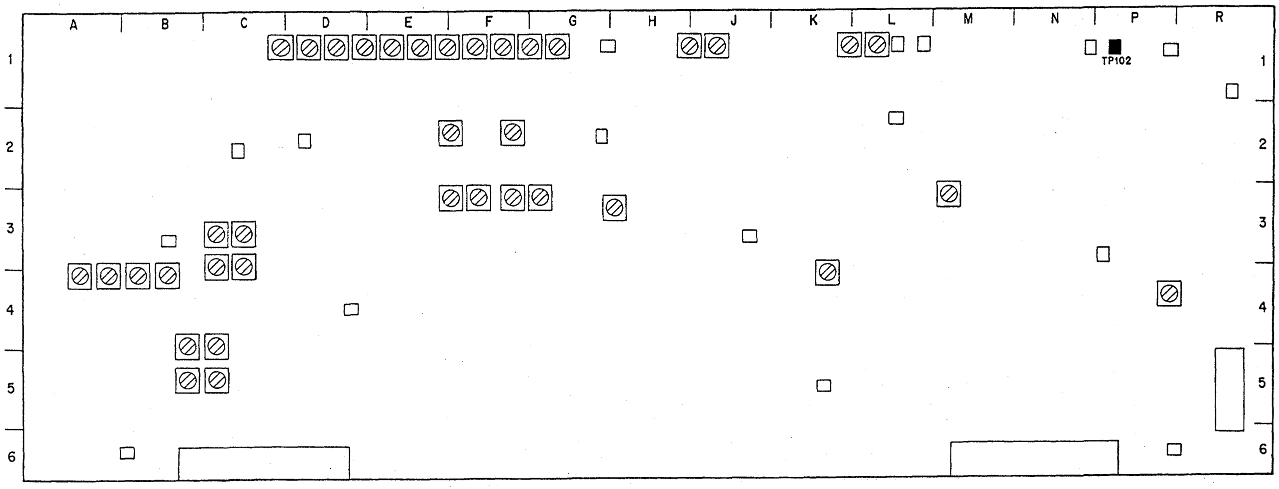
RV301
RV201
S301
S201
TP303
TP203
TP304
TP204

VP-44 board (A side)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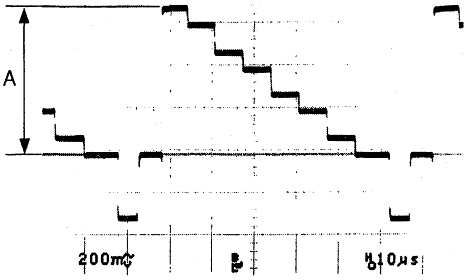
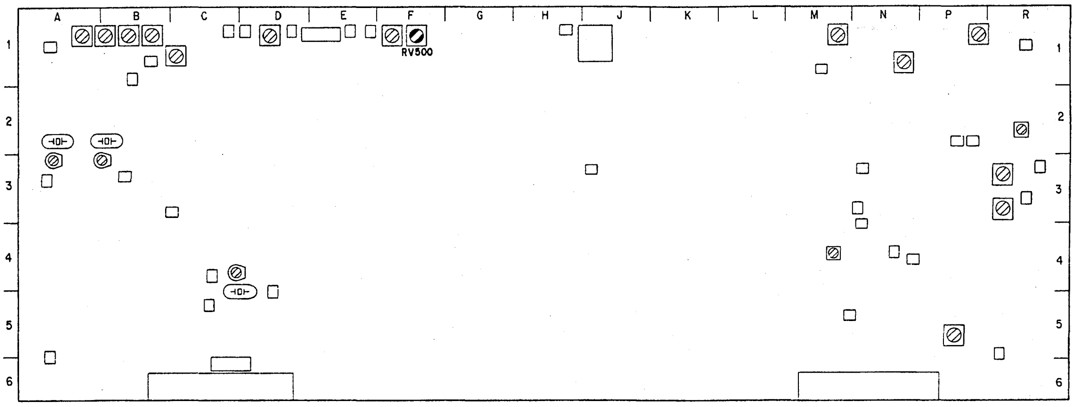
TP102

TBC-28 BOARD

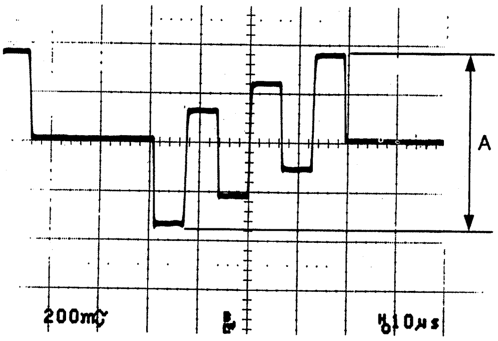
1. PB Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT G / Y OUT (75 Ω Terminated) ⊘ **RV500** / TBC-28 (F-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.700 ± 0.007 V**

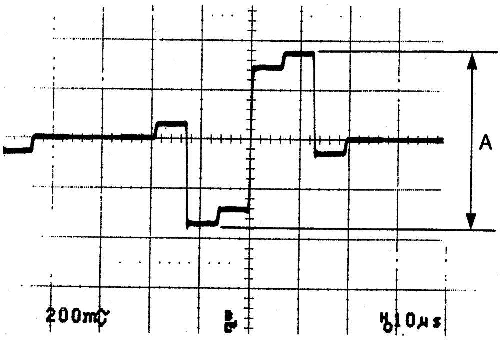
TBC-28 board (A side)



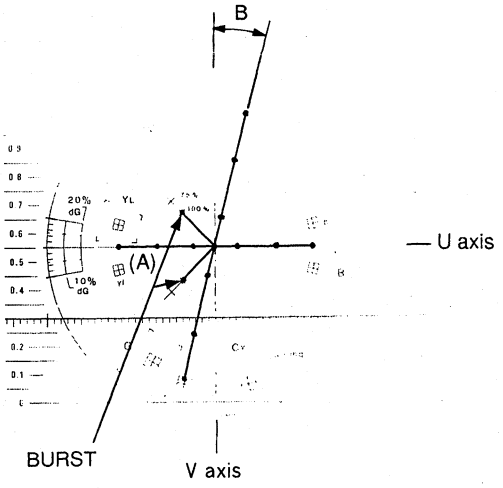
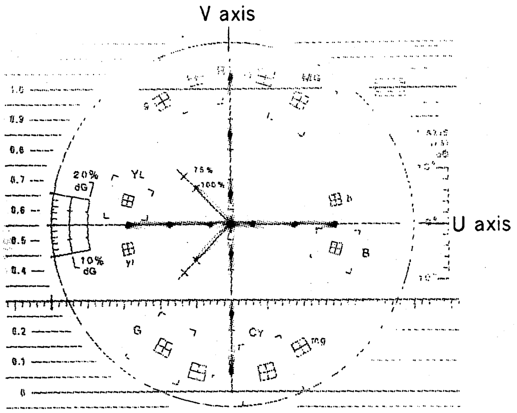
2. PB Component B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT B / B-Y OUT (75 Ω Terminated) ⊘ **RV501** / TBC-28 (F-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.700 ± 0.007 V**

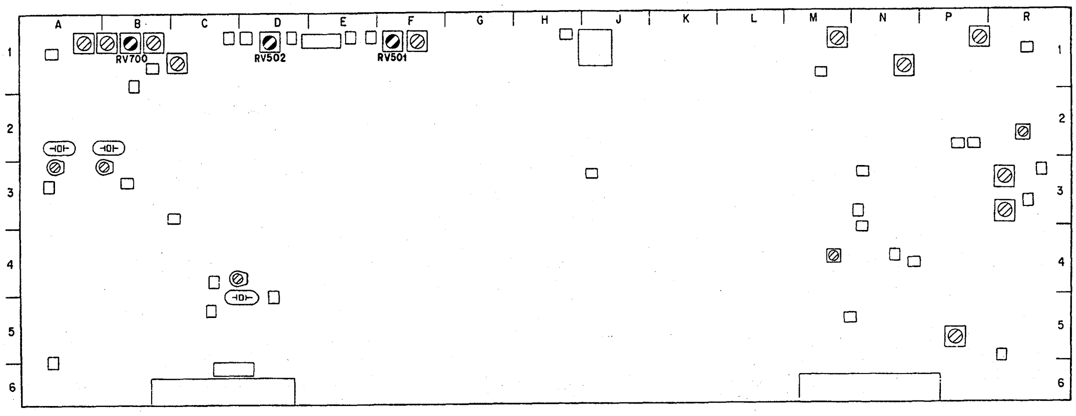
3. PB Component R-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT R / R-Y OUT (75 Ω Terminated) ⊘ **RV502** / TBC-28 (D-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.700 ± 0.007 V**

4. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Quad phase / CR5-1B PS (22 : 00 – 24 : 00) CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) (A) Burst axis ⊘ **PHASE control** / Vector (B) V axis (U / V OFFSET) ⊘ **RV700** / TBC-28 (B-1) TRIG : REF. VIDEO Vector Before adjustment  B U axis (A) BURST V axis After adjustment  V axis U axis Spec. (A) Set the dot of the burst on the right position on the scale. (B) Set the dots of the R-Y on the V axis of the vector. **B = 0 ± 1°**

TBC-28 board (A side)


A
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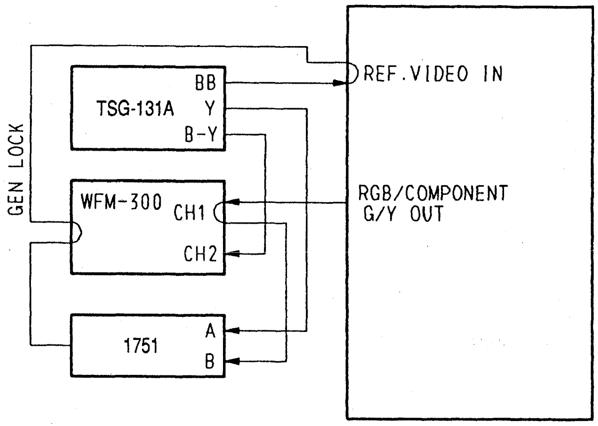
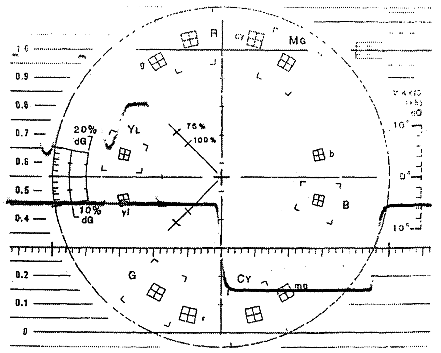
RV700
RV502
RV501

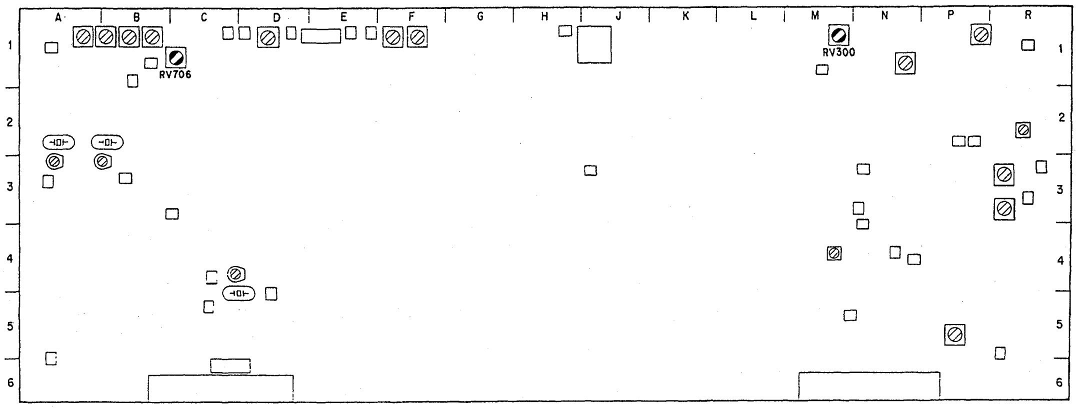
5. PB Video Phase Adjustment

[CONNECTION for Step 1 to 4]


GEN LOCK
TSG-131A
BB
Y
B-Y
WFM-300
CH1
CH2
1751
A
B
REF.VIDEO IN
RGB/COMPONENT
G/Y OUT

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • Set the following setting Waveform Vector (1751). WFM mode SWEEP : 1 μs (2H/MAG) FILTER : FLAT EXT REF : EXT GAIN : ×1	CH-A ⊘ **HORIZ POS control** / Vector CH-B ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM WFM mode  Spec. Set the SYNC falling edge to the center.

TBC-28 board (A side)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R
1
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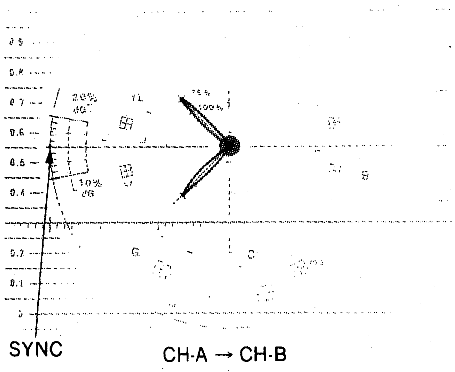
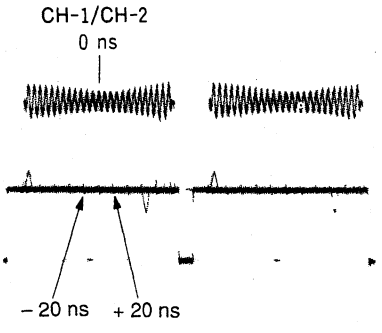
3
4
5
6
RV706
RV300

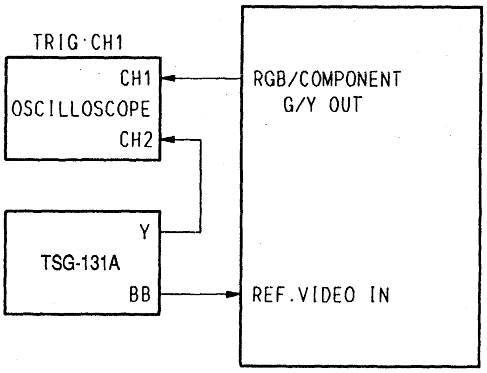
Conditions for adjustment	Adjustment point • Specifications
Step 2 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • Waveform Vector (1751) ; SCH mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM SCH mode  Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with RV706. (**Note :** The dot position should be adjust in the direction of the shortest movement.)
Step 3 • Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • WFM300 ; Bowtie mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV300** / TBC-28 (M-1) TRIG : EXT / WFM Bowtie mode  Spec. Set the Bowtie dip points (cross points of the CH-1 and CH-2) on the center marker. **0 ± 20 ns**

Continues to the next page.

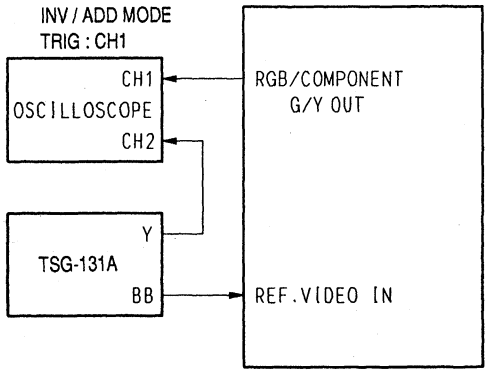
5. PB Video Phase Adjustment (Continued)

[Reference]
If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1 and 3.

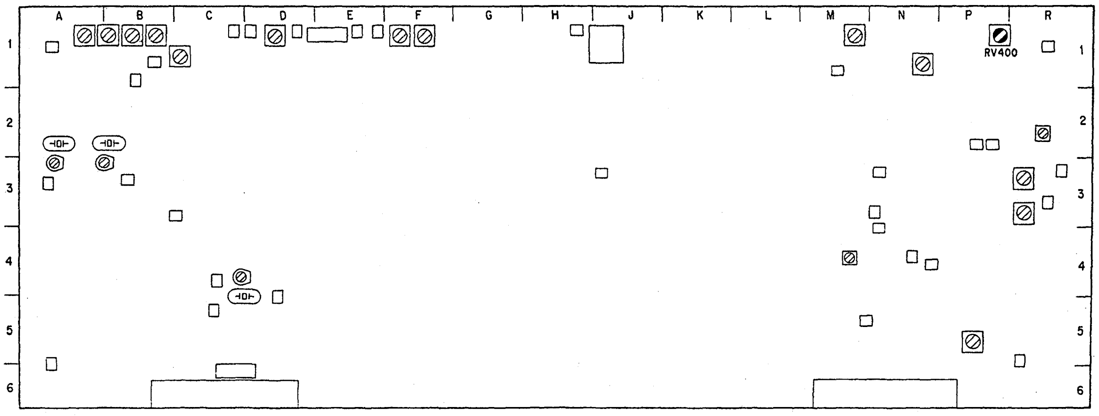
[Connection for Step 1]


TRIG·CH1
CH1
OSCILLOSCOPE
CH2
Y
TSG-131A
BB
RGB/COMPONENT
G/Y OUT
REF.VIDEO IN

[Connection for Step 3]


INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
Y
TSG-131A
BB
RGB/COMPONENT
G/Y OUT
REF.VIDEO IN

TBC-28 board (A side)


A
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D
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L
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P
R
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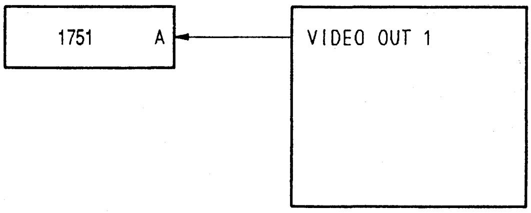
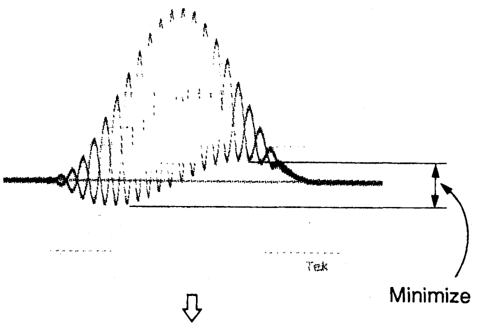
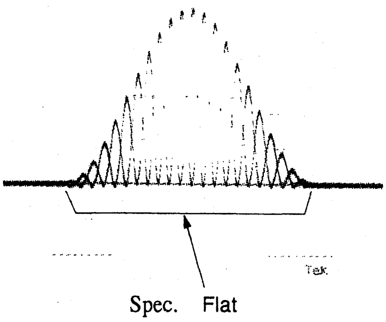
5
6
RV400

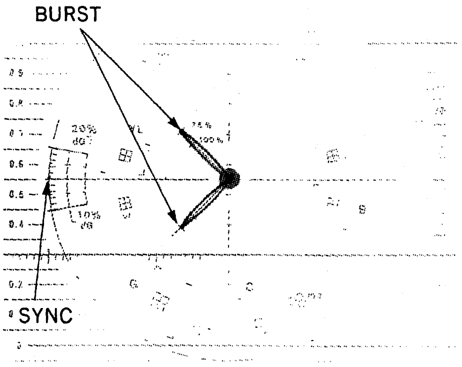
6. PB Composite Y / C Delay Adjustment

[CONNECTION]

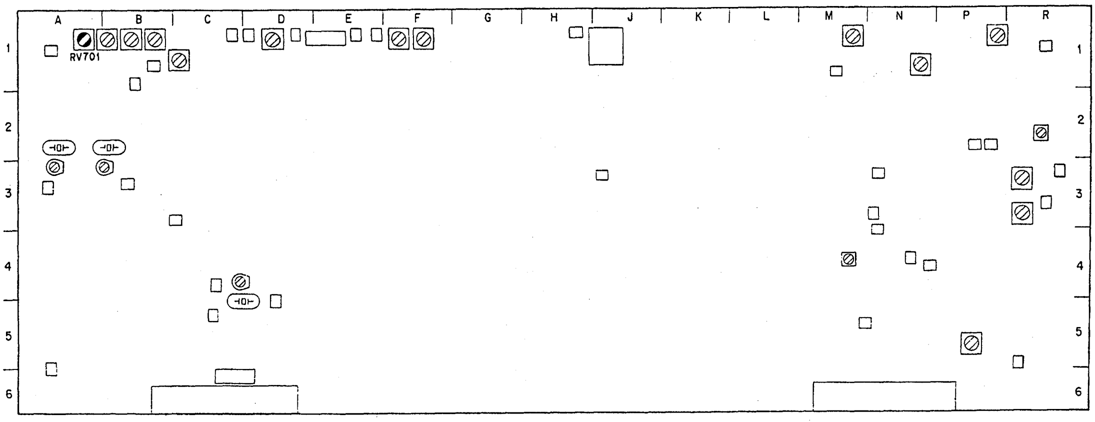


Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Line 17A / CR5-1B PS (19 : 00 – 22 : 00)	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV400** / TBC-28 (P-1) TRIG : INT / WFM WFM Before adjustment 10T portion  ⇩ After adjustment 

7. PB INT SCH Phase Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) • REF. VIDEO INPUT ; No signal • Waveform Vector (1751) ; SCH mode	VIDEO OUT 1 (75 Ω terminated) (A) Burst Adjustment ⊘ **PHASE control** / Vector (B) INT SC ⊘ **RV701** / TBC-28 (A-1) TRIG : INT / WFM SCH mode 
• After adjustment is completed, connect the REF. VIDEO INPUT. CONNECTION 3	Spec. (A) Set the dot of the burst on the normal position on the scale. (B) The SYNC should be in the center of the burst. (SCH = 0°)

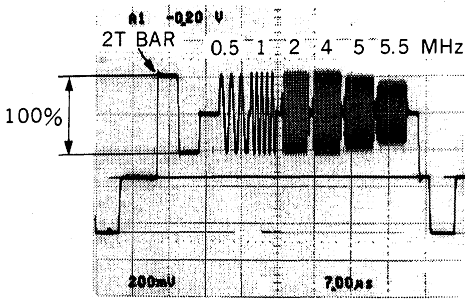
TBC-28 board (A side)



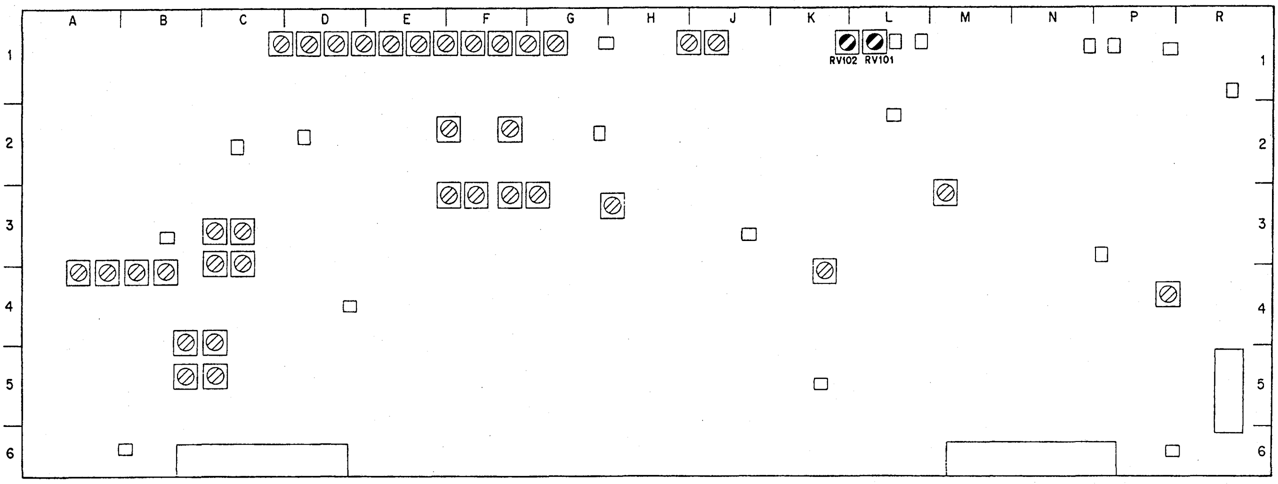
VP-44 BOARD

Note : When replaced the VP-44 board, perform the TBC-28 board adjustment too.

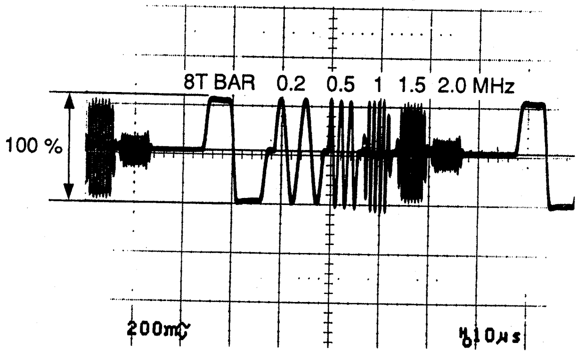
1. PB Component Y Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Multi burst signal / CR5-1B PS (8 : 00 – 11 : 00) CONNECTION 2	RGB / COMPONENT G / Y OUT (75 Ω terminated) Ach: ⊘ **RV101** / VP-44 (L-1) Bch: ⊘ **RV102** / VP-44 (K-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) 2T BAR reference 100 % (or 0 dB) **4 MHz = 98 % (100 thru 96 %) (– 0.8 ± 0.3 dB)** (2) Check the levels for following frequencies. **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1 MHz = 97 % (104 thru 90 %) (– 0.3 ± 0.6 dB)** **2 MHz = 94 % (101 thru 88 %) (– 0.5 ± 0.6 dB)** **5 MHz = 79 % (94 thru 67 %) (– 2.0 ± 1.5 dB)** (3) Flicker should not be on the monitor picture.

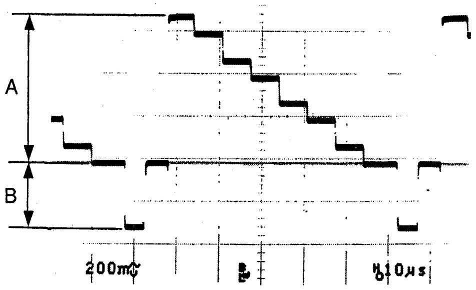
VP-44 board (A side)



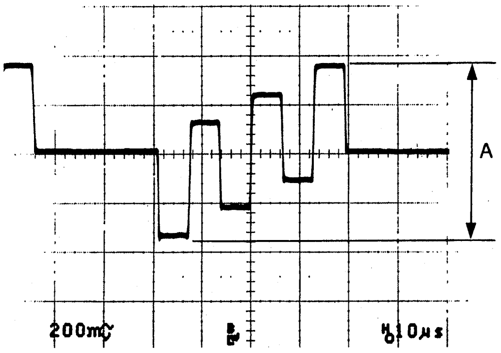
2. PB Component C Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Multi burst signal / CR5-1B PS (8 : 00 – 11 : 00) CONNECTION 2	RGB / COMPONENT R / R-Y, B / B-Y OUT (75 Ω terminated) Ach ⊘ **RV301** / VP-44 (J-1) Bch ⊘ **RV302** / VP-44 (H-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. (1) R / R-Y 8T BAR reference 100 % (or 0 dB) **1.0 MHz = 97 % (99 thru 94 %) (– 0.3 ± 0.2 dB)** (2) Check the levels for following frequencies. **0.2 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **0.5 MHz = 100 % (107 thru 94 %) (0 ± 0.6 dB)** **1.5 MHz = 87 % (93 thru 78 %) ($-1.2^{+0.6}_{-1.0}$ dB)** (3) Check that the waveform of B / B-Y satisfies the specifications above. When specification is not satisfied, perform fine adjustments so that both waveforms of R / R-Y and B / B-Y satisfy the specification.

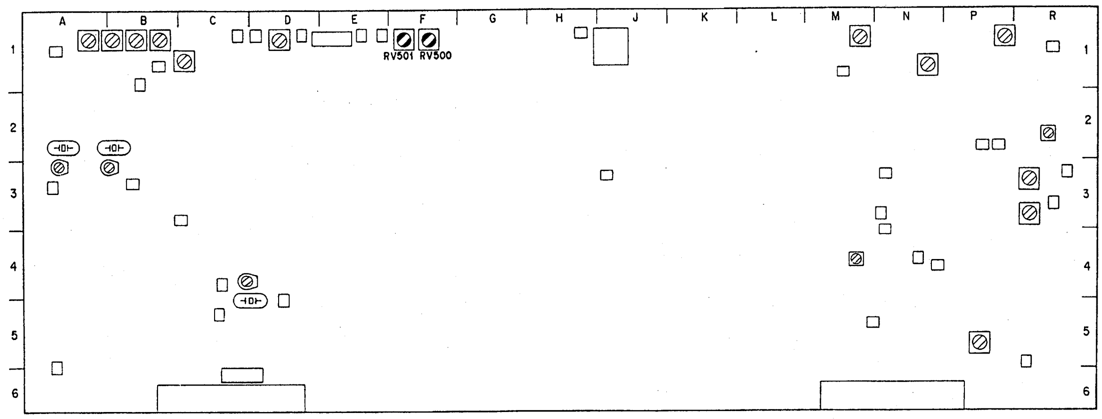
3. PB Component Y Level Adjustment <TBC-28 Board>

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT G / Y OUT (75 Ω terminated) (A) COMPONENT Y ⊘ **RV500** / TBC-28 (F-1) (B) Check TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.007 V** (ADJUSTMENT) **B = 0.300 ± 0.009 V** (CHECK)

4. PB Component B-Y Level Adjustment <TBC-28 Board>

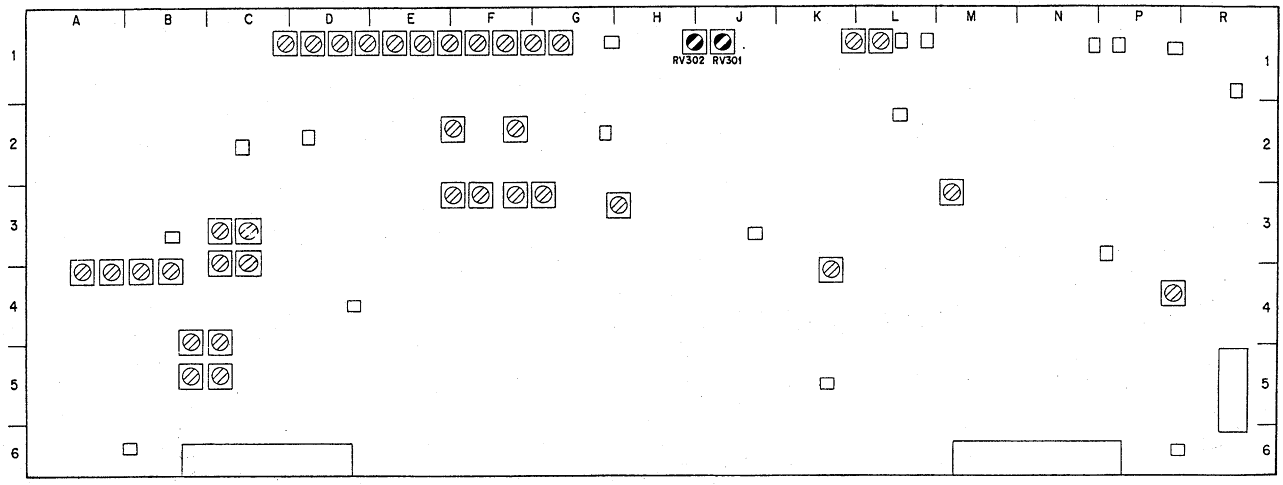
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT B / B-Y OUT (75 Ω terminated) ⊘ **RV501** / TBC-28 (F-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. A = **0.700 ± 0.007 V**

TBC-28 board (A side)



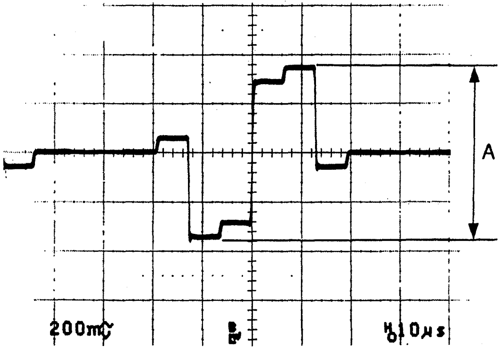
A B C D E F G H J K L M N P R
1 2 3 4 5 6
RV501 RV500

VP-44 board (A side)

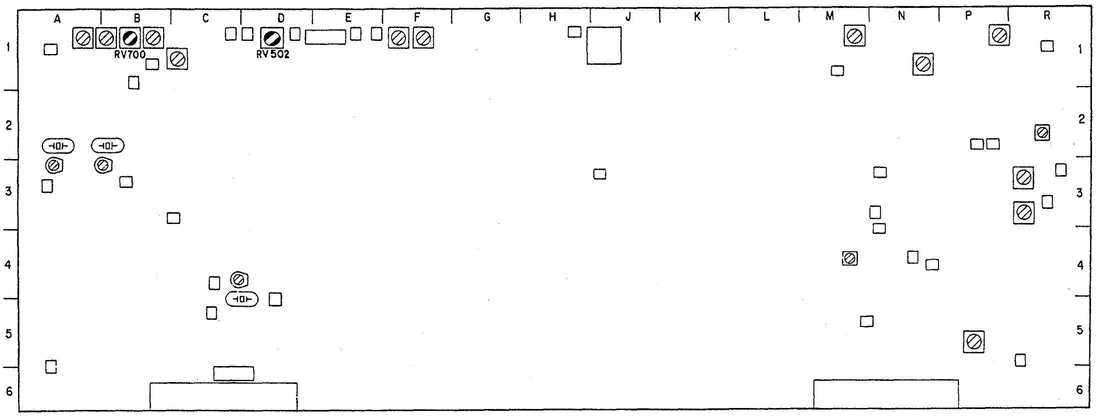


A B C D E F G H J K L M N P R
1 2 3 4 5 6
RV302 RV301

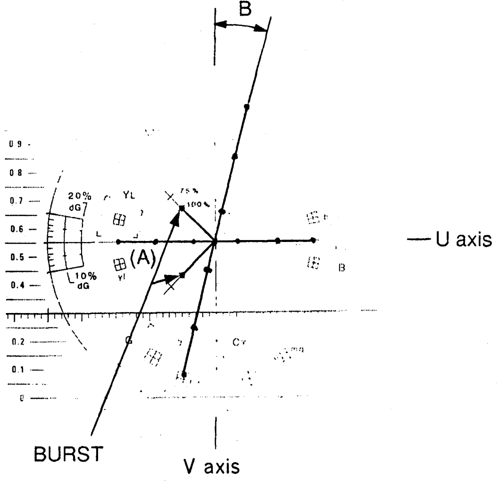
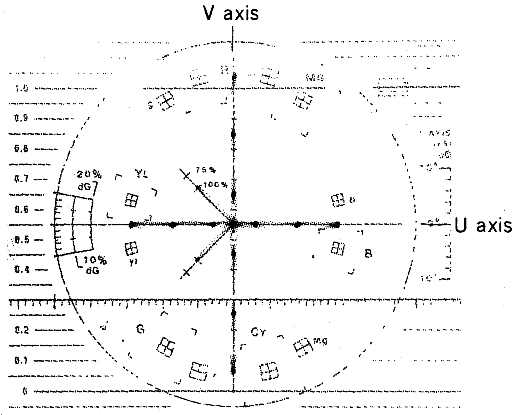
5. PB Component R-Y Level Adjustment <TBC-28 Board>

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 2	RGB / COMPONENT R / R-Y OUT (75 Ω terminated) ⊘ **RV502** / TBC-28 (D-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.700 ± 0.007 V**

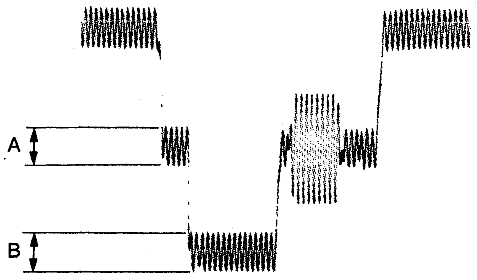
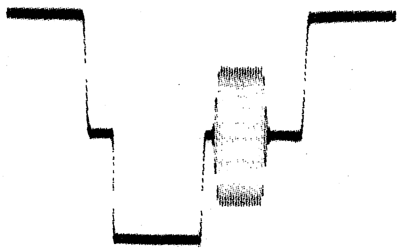
TBC-28 board (A side)

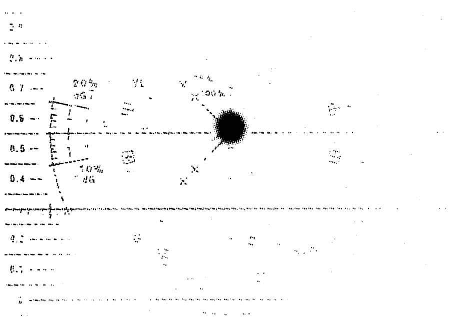

A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV700
RV502

6. U-V Axis Phase (B-Y, R-Y Phase) Adjustment <TBC-28 Board>

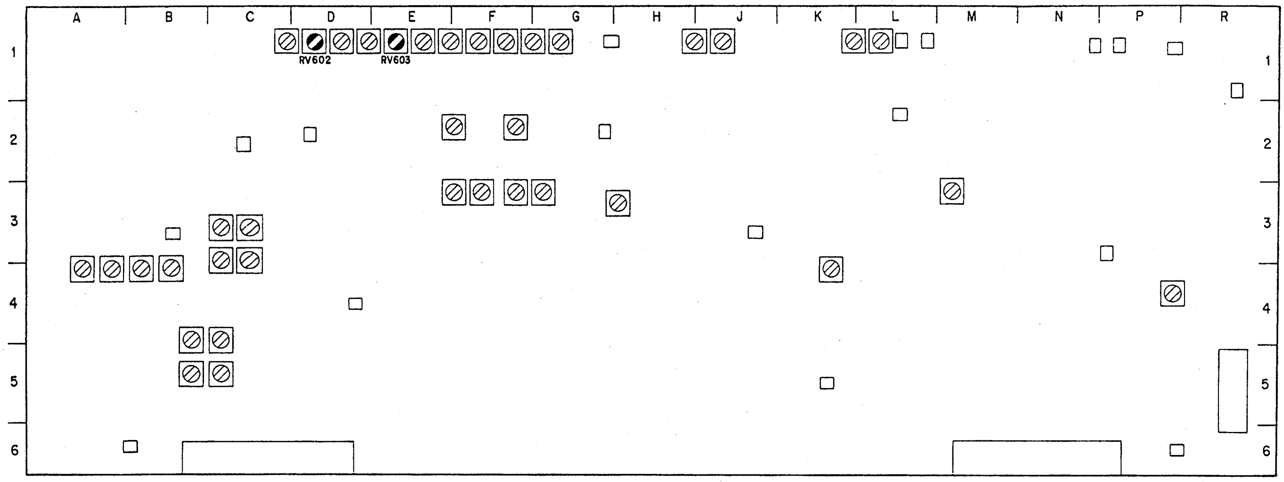
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Quad phase / CR5-1B PS (22 : 00 – 24 : 00) CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) (A) Burst **⊘ PHASE control** / Vector (B) V axis (U / V OFFSET) **⊘ RV700** / TBC-28 (B-1) TRIG : REF. VIDEO Vector Before adjustment  B 20% dG YL 75% 100% (A) 10% dG U axis BURST V axis ⇩ After adjustment  V axis 20% dG YL 75% 100% 10% dG U axis G CY MG B Spec. (A) Set the dot of the burst on the right position on the scale. (B) Set the dots of the R-Y on the V axis of the vector. **B = 0 ± 1°**

7. PB Composite SC Leak Adjustment

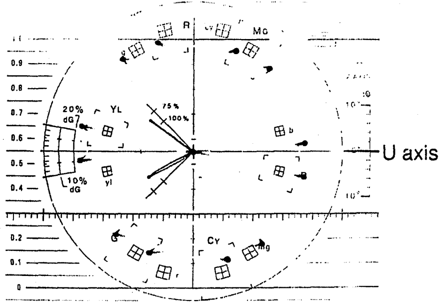
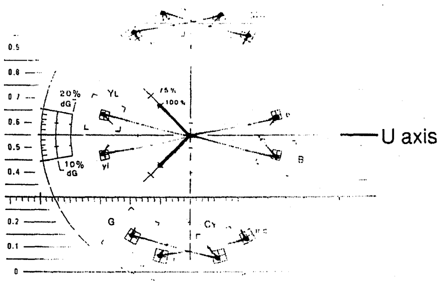
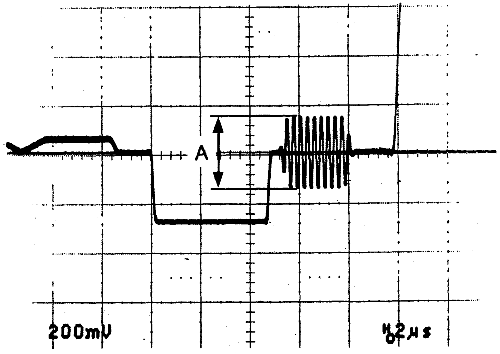
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) • Waveform Vector (1751) ; WFM mode • Set the time axis of the WFM to magnification mode. CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) (A) U SC LEAK ⊘ **RV603** / VP-44 (E-1) (B) V SC LEAK ⊘ **RV602** / VP-44 (D-1) TRIG : REF. VIDEO WFM mode Before adjustment  ⇩ After adjustment  Spec. Minimize the A, B. **A, B ≦ 7 mV** Adjust alternately.

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Flat field / CR5-1B PS (24 : 00 – 26 : 00) • Waveform Vector (1751) ; Vector mode CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO Vector mode  Spec. Maximum the gain of the Vector and check the dot is at center.

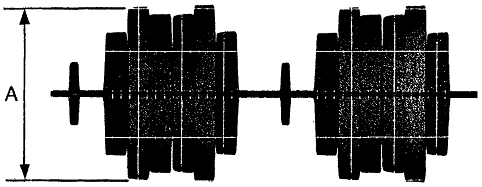
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV602
RV603

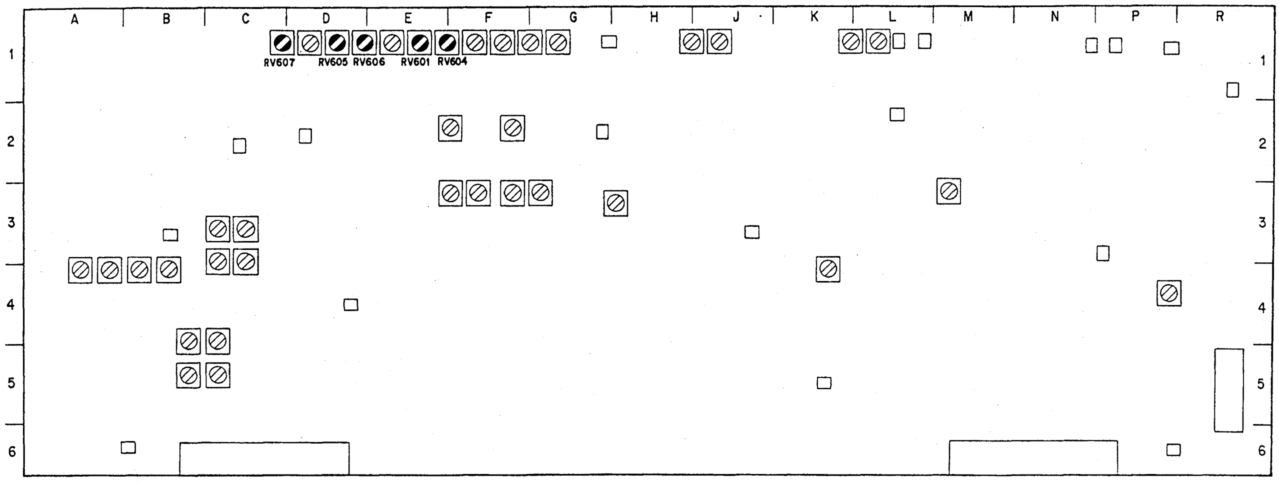
8. PB Composite C / Burst Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 3	Step 1 VIDEO OUT 1 (75 Ω terminated) (A) Burst preset ⊘ **PHASE control** / Vector (B) V axis (ENC R-Y) ⊘ **RV605** / VP-44 (D-1) U axis (ENC B-Y) ⊘ **RV606** / VP-44 (D-1) (C) Burst level / 90° ⊘ **RV601** / VP-44 (E-1) ⊘ **RV604** / VP-44 (E-1) Vector Before adjustment  After adjustment  Spec. (A) Set the two bursts to be symmetrical with regard to the U axis. (B) All dots should be inside the " ⊞ " mark on the vector by adjustment RV605 and RV606 alternately. (C) Set the dot of the two bursts on the right position on the scale.
	Step 2 (Check) VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.300 ± 0.007 V**

9. PB S-VIDEO C Adjustment

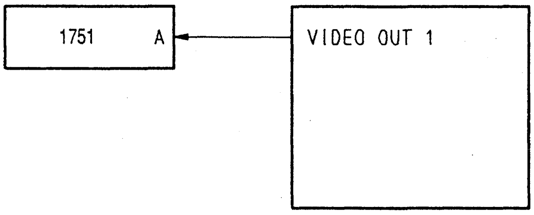
Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 100 % Color bar / CR5-1B PS (14 : 00 – 17 : 00) CONNECTION 3	S-VIDEO (C) OUT 1 (75 Ω terminated) ⊘ **RV607** / VP-44 (C-1) TRIG : REF. VIDEO WFM or Oscilloscope  Spec. **A = 0.885 ± 0.01 V**

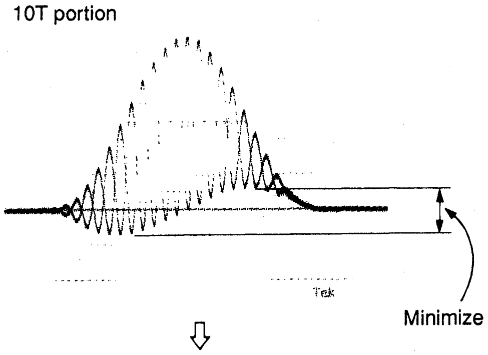
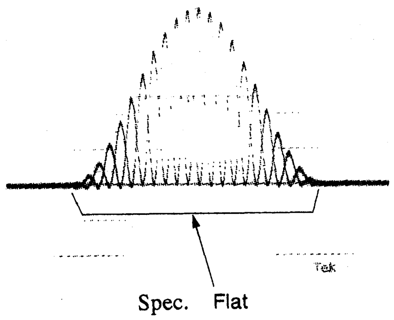
VP-44 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV607
RV605
RV606
RV601
RV604

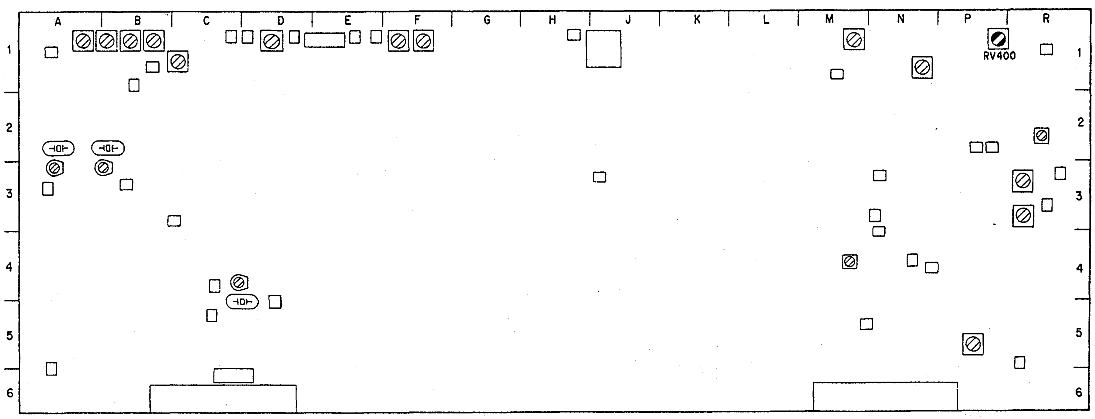
10. PB Composite Y / C Delay Adjustment <TBC-28 Board>

[CONNECTION]


1751
A
VIDEO OUT 1

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode Line 17A / CR5-1B PS (19 : 00 – 22 : 00)	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV400** / TBC-28 (P-1) TRIG : INT / WFM WFM Before adjustment  ⇩ After adjustment 

TBC-28 board (A side)


A
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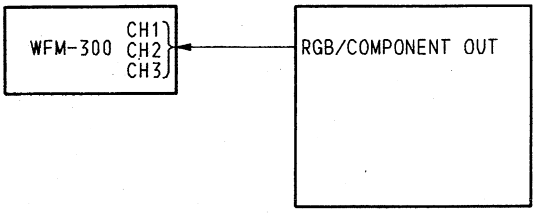
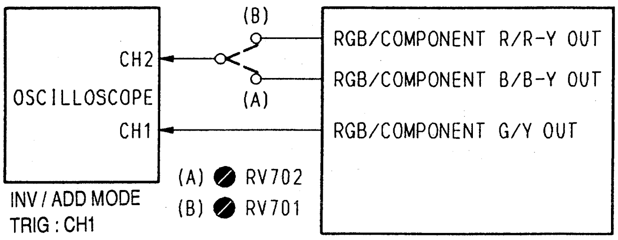
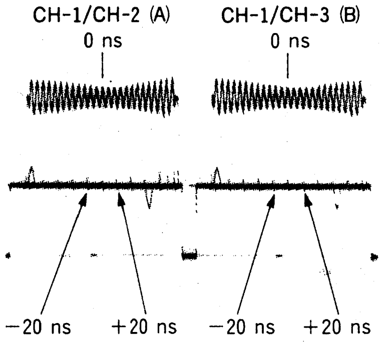
RV400

11. PB Component Y / C Delay Adjustment

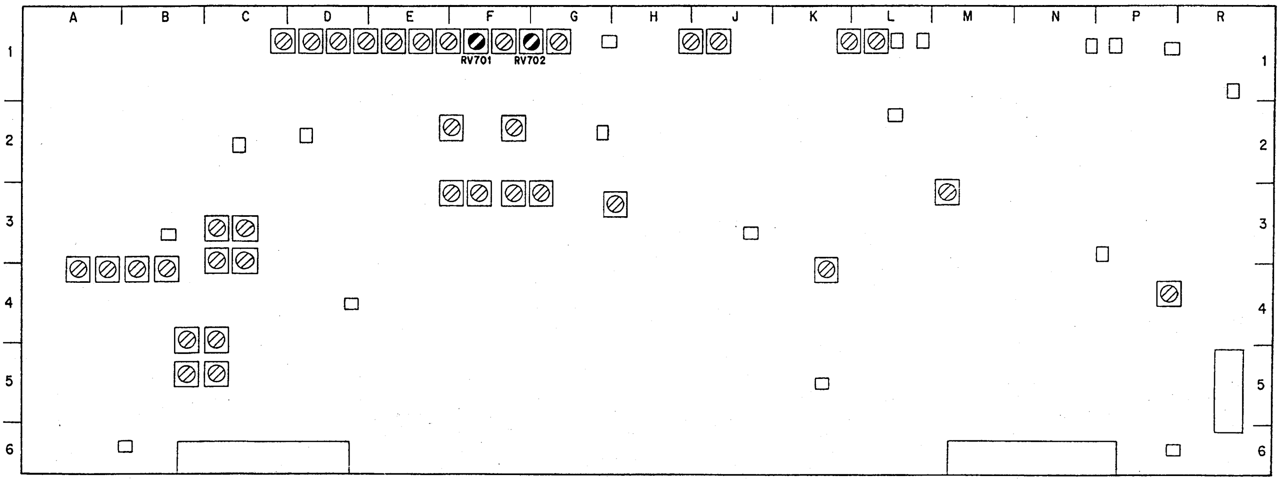
[CONNECTION]


WFM-300
CH1
CH2
CH3
RGB/COMPONENT OUT


OSCILLOSCOPE
CH2
CH1
INV / ADD MODE
TRIG : CH1
(B)
(A)
(A) RV702
(B) RV701
RGB/COMPONENT R/R-Y OUT
RGB/COMPONENT B/B-Y OUT
RGB/COMPONENT G/Y OUT

Conditions for adjustment	Adjustment point • Specifications
• Do not use the extention board. • PB mode 50 % Bowtie & 10T / CR5-1B PS (17 : 00 – 19 : 00) • WFM300 ; Bowtie mode	RGB / COMPONENT OUT (75 Ω terminated) (A) B-Y DELAY **RV702** / VP-44 (G-1) (B) R-Y DELAY **RV701** / VP-44 (F-1) TRIG : EXT / WFM Bowtie mode  Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. **0 ± 20 ns**

VP-44 board (A side)


A
B
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K
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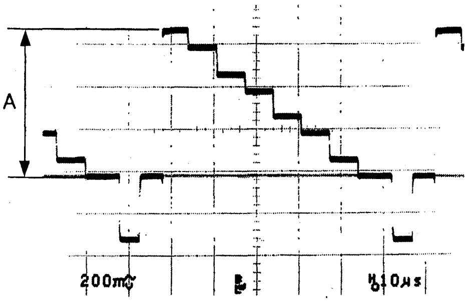
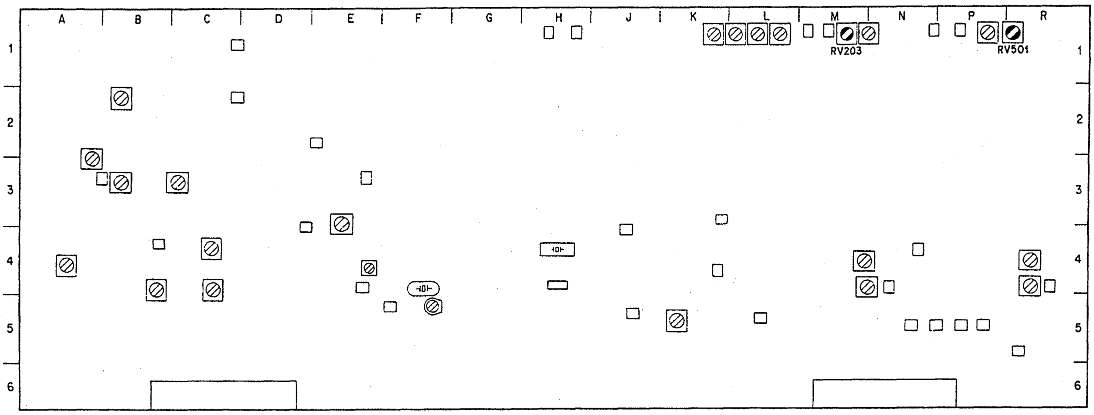
R
1
2
3
4
5
6
RV701
RV702

VRA-7 BOARD

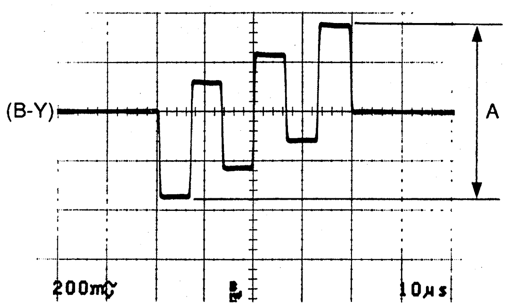
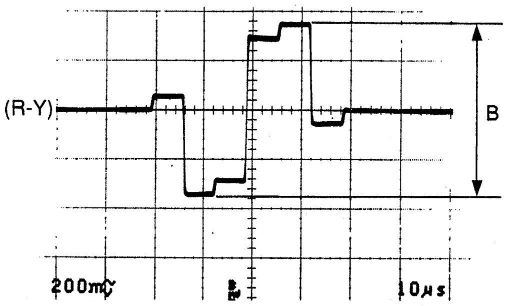
1. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 2	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV501** / VRA-7 (R-1) TRIG : REF. VIDEO WFM or oscilloscope  Spec. **A = 0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • Play back the recorded portion. Blank tape CONNECTION 2	Spec. Satisfied the spec. refering Step 1.

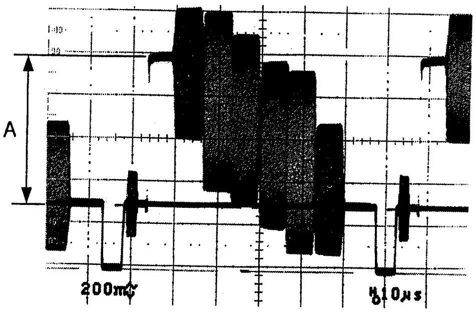
VRA-7 board (A side)



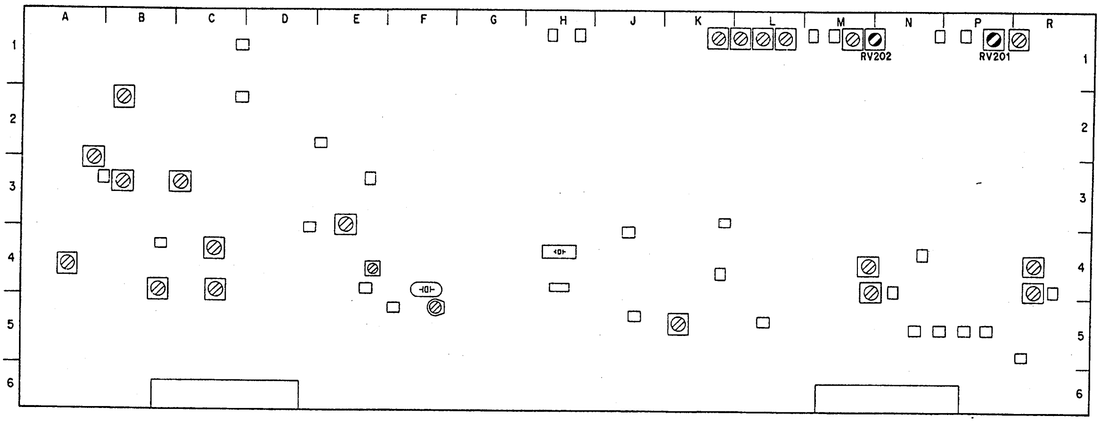
2. Overall Component R-Y / B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar CONNECTION 2	RGB / COMPONENT B / B-Y, R / R-Y OUT (75 Ω terminated) (A) · (B) CNT-C LEVEL ⊘ **RV203** / VRA-7 (M-1) TRIG : REF. VIDEO WFM or oscilloscope   Spec. **A = B = 0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • RGB / COMPONENT INPUT ; COMPONENT 100 % Color bar • Play back the recorded portion. Blank tape CONNECTION 2	Spec. Satisfied the spec. refering Step 1, B / B-Y and R / R-Y.

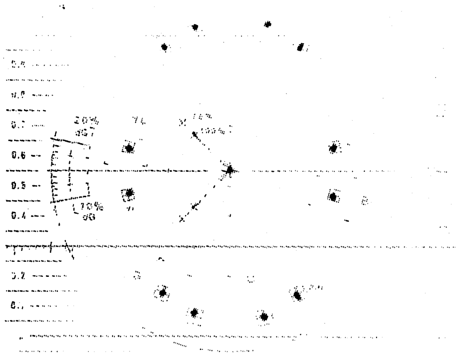
3. Overall Composite Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV201** / VRA-7 (P-1) TRIG : REF. VIDEO WFM or oscilloscope  Spec. **A = 0.70 ± 0.02 V**
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 3	Spec. Satisfied the spec. refering Step 1.

VRA-7 board (A side)

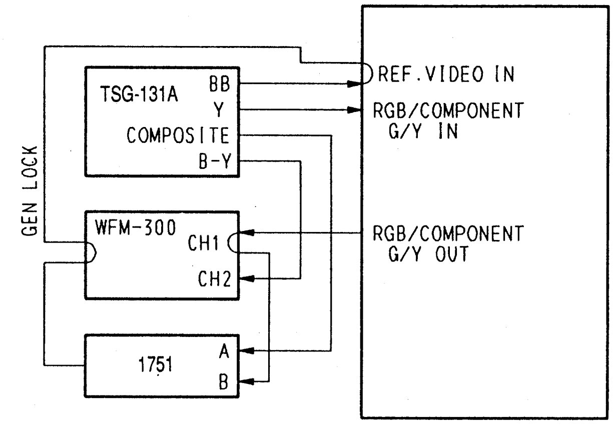


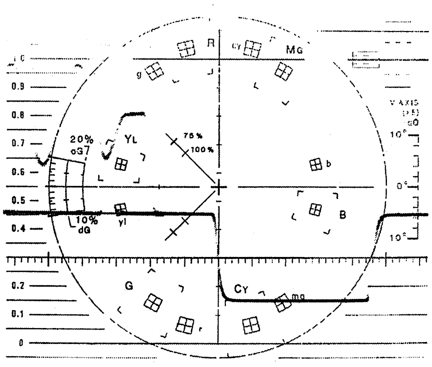
4. Overall Composite C Level Adjustment

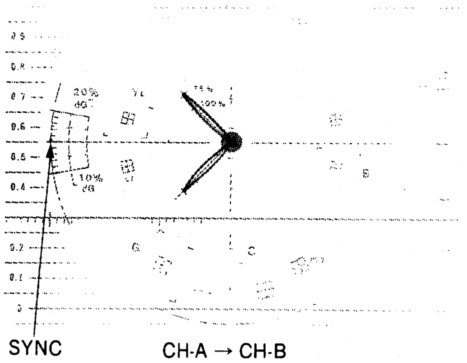
Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) (A) Burst ⊘ **PHASE control** / Vector (B) C ST-C LEVEL ⊘ **RV202** / VRA-7 (N-1) TRIG : REF. VIDEO Vector  Spec. (A) Set the dot of the burst on the right position on the scale. (B) All dots should be inside the " ⊞ " mark on the vector.
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE 100 % Color bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 3	Spec. Satisfied the spec. refering Step 1.

5. Overall Video Phase Adjustment

[CONNECTION for Step 1 to 4]

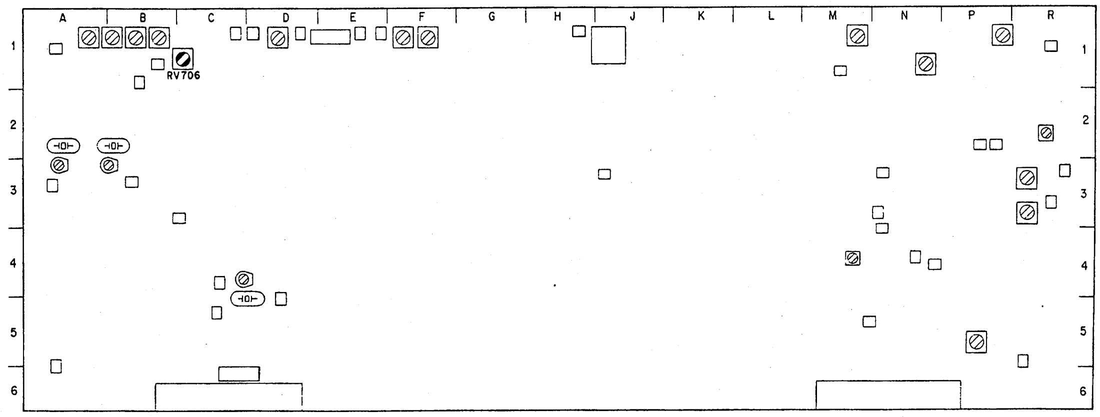

TSG-131A
BB
Y
COMPOSITE
B-Y
GEN LOCK
WFM-300
CH1
CH2
1751
A
B
REF.VIDEO IN
RGB/COMPONENT
G/Y IN
RGB/COMPONENT
G/Y OUT

Conditions for adjustment	**Adjustment point • Specifications**
Step 1 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • Set the following setting Waveform Vector (1751). WFM mode SWEEP : 1 μs (2H / MAG) FILTER : FLAT EXT REF : EXT GAIN : ×1	CH-A ⊘ **HORIZ POS control** / Vector CH-B ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM WFM mode  Spec. Set the SYNC falling edge to the center.

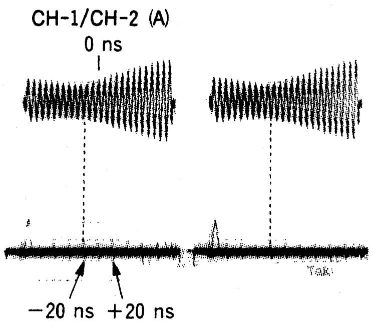
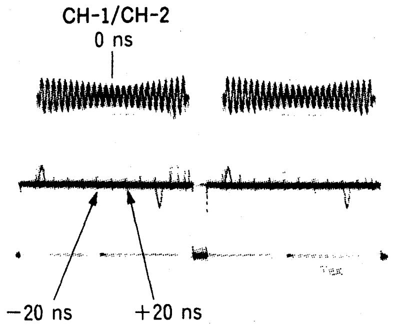
Conditions for adjustment	Adjustment point • Specifications
Step 2 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • Waveform Vector (1751) ; SCH mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV706** / TBC-28 (C-1) TRIG : EXT / WFM SCH mode  Spec. 1. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. 2. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with RV706. (**Note :** The dot position should be adjust in the direction of the shortest movement.)

Continues to the next page.

TBC-28 board (A side)



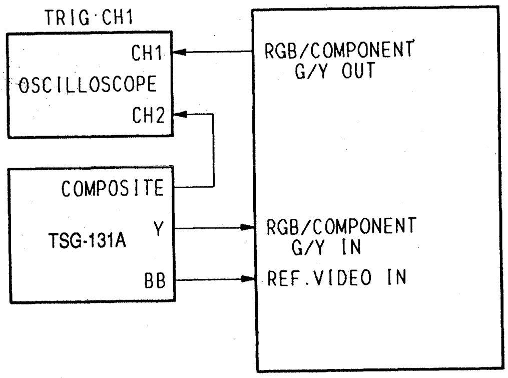
5. Overall Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
Step 3 • Do not use the extention board. • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • WFM300 ; Bowtie mode	RGB / COMPONENT G / Y OUT (75 Ω terminated) ⊘ **RV302** / VRA-7 (K-1) TRIG : EXT / WFM Bowtie mode Before adjustment  After adjustment  Spec. Set the Bowtie dip points (cross points of the CH-1 and CH-2) on the center marker.
Step 4 • Do not use the extention board. • RGB / COMPONENT INPUT ; 50 % Bowtie • Play back the recorded portion. Blank tape	Spec. Difference on Bowtie dip point → **0 ± 20 ns** When specification is not satisfied → Adjust Step 3 again and check that perform Step 4

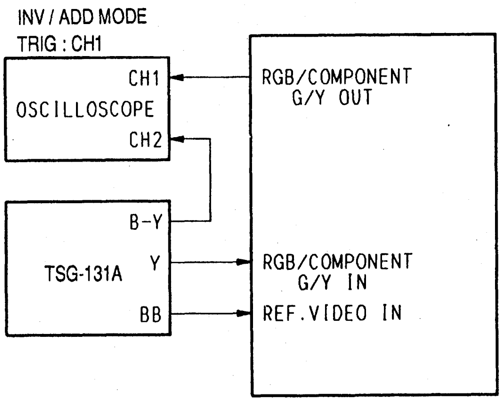
[Reference]

If not prepare the WFM300 / 1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

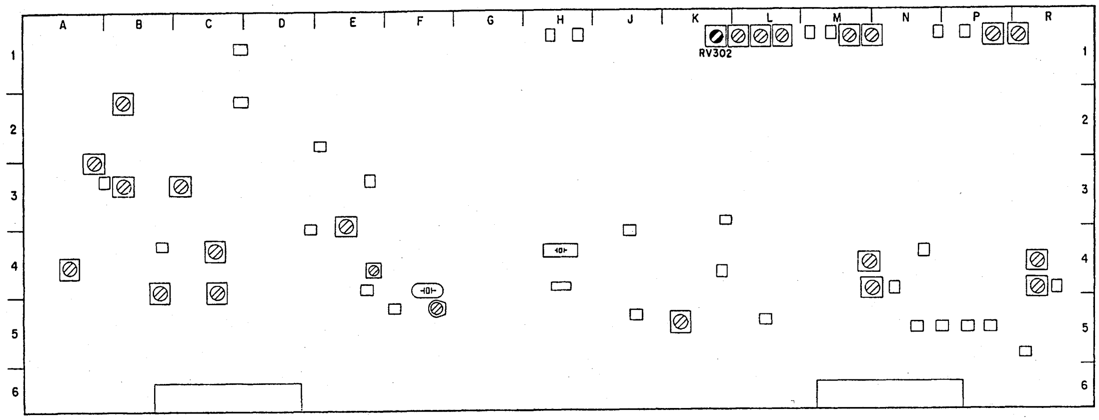
[Connection for Step 1]


TRIG·CH1
CH1
OSCILLOSCOPE
CH2
COMPOSITE
TSG-131A
Y
BB
RGB/COMPONENT G/Y OUT
RGB/COMPONENT G/Y IN
REF.VIDEO IN

[Connection for Step 3 / 4]

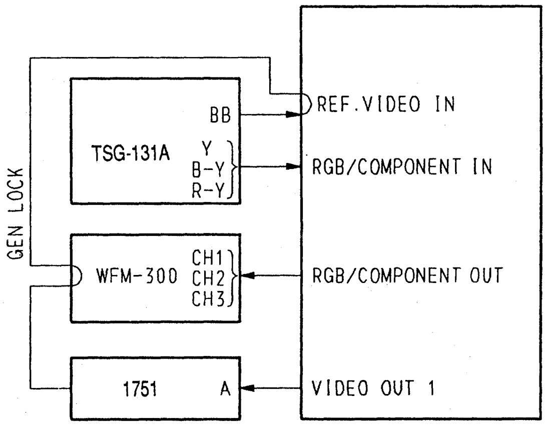

INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
B-Y
TSG-131A
Y
BB
RGB/COMPONENT G/Y OUT
RGB/COMPONENT G/Y IN
REF.VIDEO IN

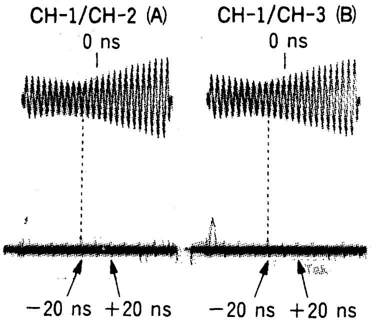
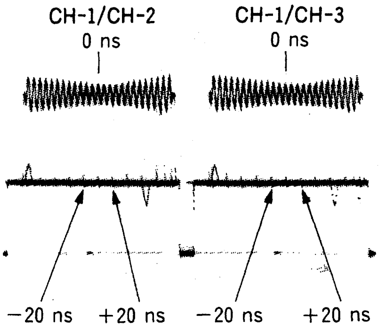
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV302

6. Overall Component Y / C Delay Adjustment

[CONNECTION]

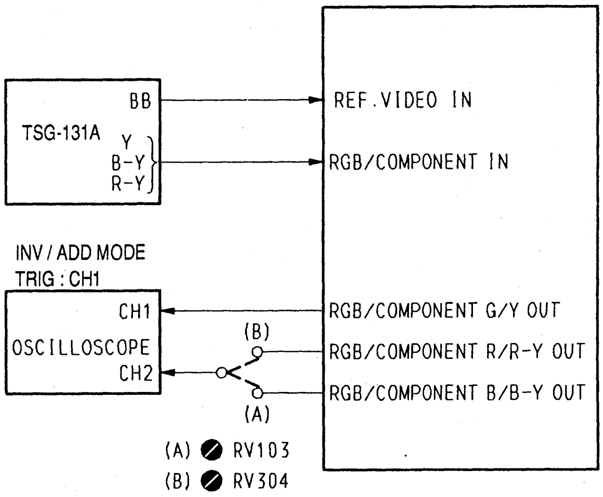

GEN LOCK
TSG-131A
BB
Y
B-Y
R-Y
WFM-300
CH1
CH2
CH3
1751
A
REF.VIDEO IN
RGB/COMPONENT IN
RGB/COMPONENT OUT
VIDEO OUT 1

Conditions for adjustment	Adjustment point • Specifications
Step 1 • EE mode • RGB / COMPONENT INPUT ; 50 % Bowtie • WFM300 ; Bowtie mode **Note :** Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.	RGB / COMPONENT OUT (75 Ω terminated) (A) C-C DELAY **⊘ RV103** / VRA-7 (C-4) (B) CAV Y / C DELAY **⊘ RV304** / VRA-7 (L-1) TRIG : EXT / WFM Bowtie mode Before adjustment  ⇩ After adjustment  Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. **0 ± 10 ns**

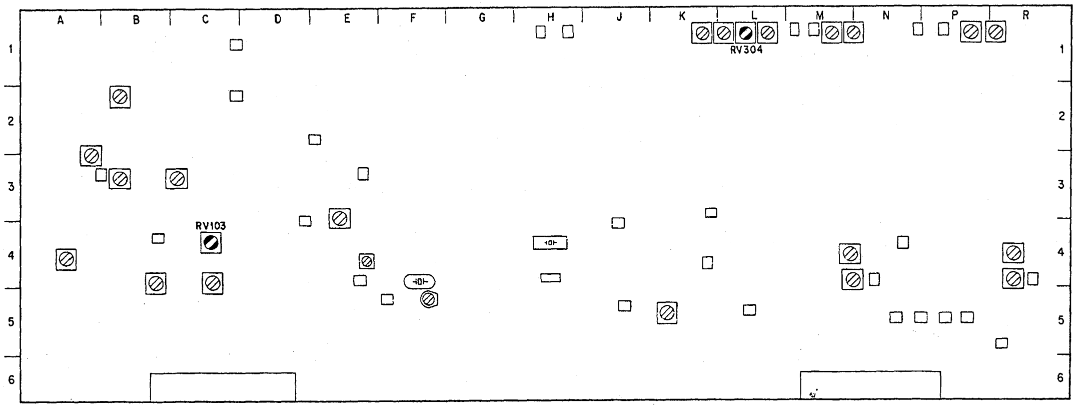
Conditions for adjustment	Adjustment point • Specifications
Step 2 • RGB / COMPONENT INPUT ; 50 % Bowtie • Play back the recorded portion. Blank tape	Spec. Difference on Bowtie dip point → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

[Reference]

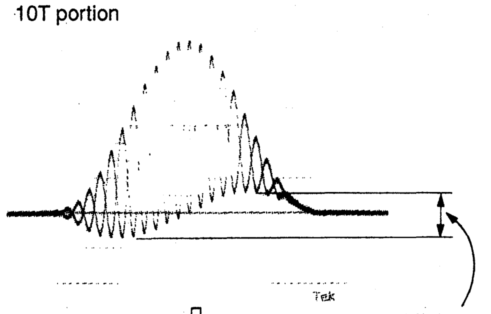
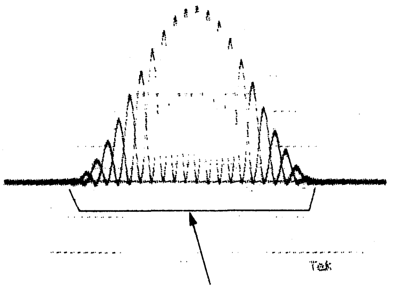
If not prepare the WFM300, connect the oscilloscope following figure for adjust.


TSG-131A
BB
Y
B-Y
R-Y
REF.VIDEO IN
RGB/COMPONENT IN
INV / ADD MODE
TRIG : CH1
CH1
OSCILLOSCOPE
CH2
(B)
(A)
RGB/COMPONENT G/Y OUT
RGB/COMPONENT R/R-Y OUT
RGB/COMPONENT B/B-Y OUT
(A) RV103
(B) RV304

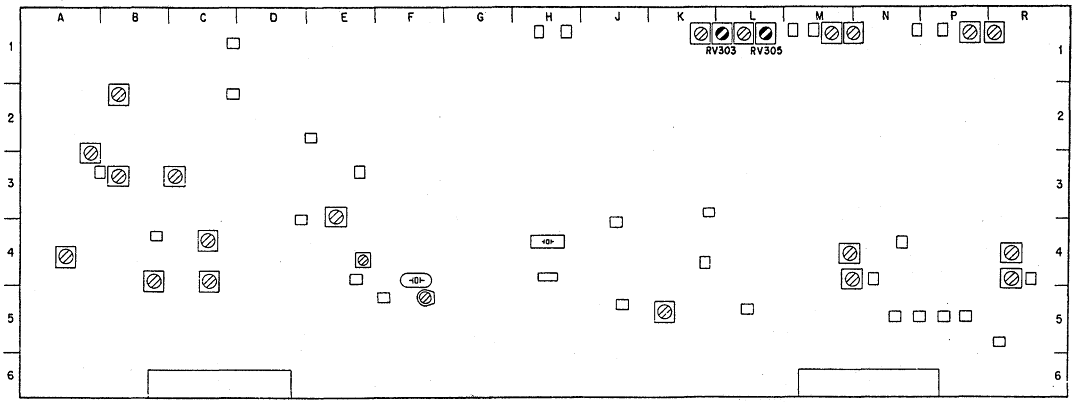
VRA-7 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
RV103
RV304

7. Overall Composite Y / C Delay Adjustment

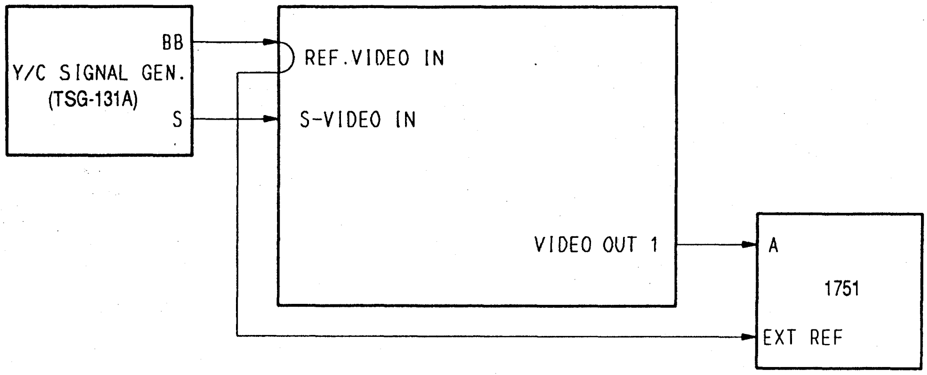
Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • VIDEO INPUT ; COMPOSITE Pulse & Bar • VIDEO IN switch / Sub control panel ; COMPOSITE CONNECTION 3	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV303** / VRA-7 (L-1) TRIG : REF. VIDEO WFM Before adjustment  After adjustment  Spec. Flat (Compensate the difference of Step 2 after adjustment second time)
Step 2 • Do not use the extention board. • VIDEO INPUT ; COMPOSITE Pulse & Bar • VIDEO IN switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape CONNECTION 3	Spec. Difference from at center → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

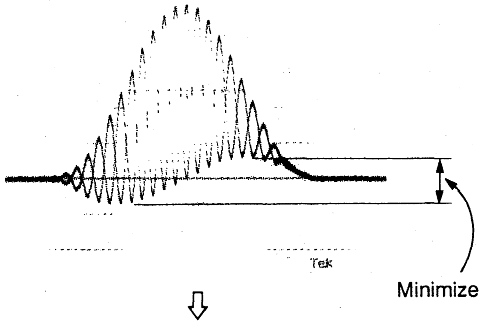
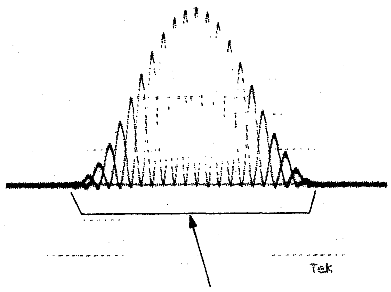
VRA-7 board (A side)



8. Overall S-VIDEO Y / C Delay Adjustment

[CONNECTION]


BB
Y/C SIGNAL GEN.
(TSG-131A)
S
REF.VIDEO IN
S-VIDEO IN
VIDEO OUT 1
A
1751
EXT REF

Conditions for adjustment	Adjustment point • Specifications
Step 1 • Do not use the extention board. • EE mode • S-VIDEO INPUT ; S-VIDEO Pulse & Bar • VIDEO IN switch / Sub control panel ; S-VIDEO	VIDEO OUT 1 (75 Ω terminated) ⊘ **RV305** / VRA-7 (L-1) TRIG : EXT / WFM WFM Before adjustment 10T portion  ⇩ After adjustment  Spec. Flat

Continues to the next page.

8. Overall S-VIDEO Y / C Delay Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
Step 2 • Do not use the extention board. • S-VIDEO INPUT ; S-VIDEO Pulse & Bar • VIDEO IN switch / Sub control panel ; S-VIDEO • Play back the recorded portion. Blank tape	Spec. Difference from center → **0 ± 20 ns** When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.

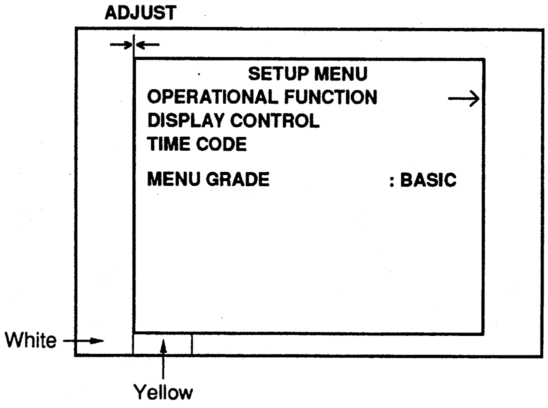
SS-61 BOARD

1. System ID Switch Setting

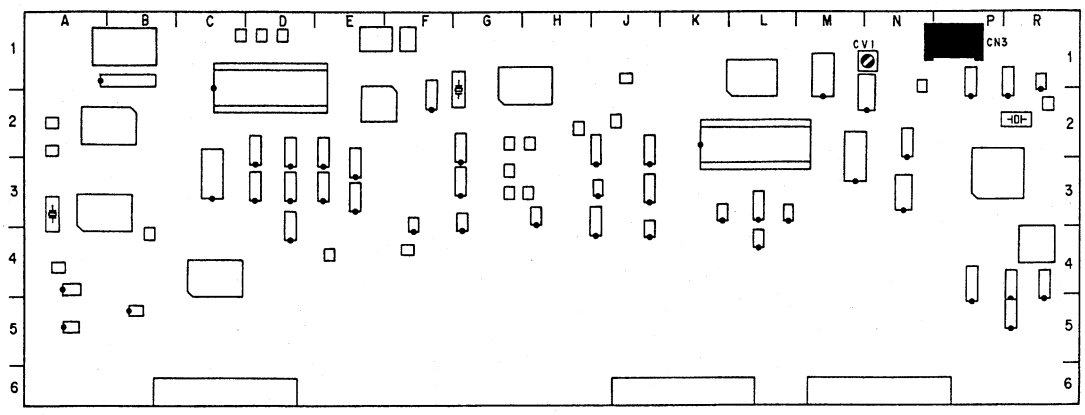
Switch No.		Function	ON	OFF
S1	1	SYSTEM ID SW	UVW-1700G/1700GP	UVW-1400A/1400AP
	2		factory use	factory use
	3		for J	for UC/EK
	4		NTSC	PAL

※ ▭ FACTORY SETTING
S1-1, S1-3, S1-4, are set to the position based on the unit.
If the initial switch settings are changed, perform fail to feature.

2. Character Size Adjustment

Preparations for Adjustment	Adjustments • Specification
• CHARACTER switch/Sub control panel : ON • Press the MENU button on the sub control panel once. • PB mode 100 % Color bar/CR5-1B PS (14:00 - 17:00) • After adjustment is completed, press the MENU button and display the original picture.	VIDEO 2 (SUPER) OUTPUT (75 Ω terminated) ⊘ **CV1**/SS-61 (N-1) Adjust the setup menu display, and position the left side frame at the bounder between the white and yellow signals of the color bars signal. Then, position the all sides frames at the center of the monitor.  ADJUST SETUP MENU OPERATIONAL FUNCTION → DISPLAY CONTROL TIME CODE MENU GRADE : BASIC White Yellow

SS-61 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
CV1
CN3